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The Regulation of the Female Sexual Cycle*

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In view of the recent advances in the knowledge of the means by which the sexual cycle in female animals is controlled and regulated, perhaps an attempt to review briefly the present position may not be without interest. In so doing I hope I have not attempted too large a task nor one which will appear too academic, and that some information of practical value may be drawn from it. I would point out that no real advance can be made in veterinary or any other applied science without a study first being made of the fundamental principles involved. This of necessity entails much purely academic work upon the results of which depends whether or no any improvement in the application of the science is to be made.

When the age of puberty is reached, in any poly-oestrus animal certain well-defined cyclical changes take place in the gonads. These may be briefly summarised as follows:—

Di-oestrus, or period of rest, in which the ovaries are inactive; the Graafian follicles are developing slowly, if at all; the uterus is anaemic and its glands inactive; the mucous secretion from the vagina is scanty and contains cornified epithelial cells from the superficial vaginal epithelium and a few leucocytes. This stage lasts in the mare about seven days and is followed by

Pro-oestrus, which is marked by an increased activity on the part of the reproductive organs. In the ovary the Graafian follicles undergo development and the follicle to rupture at the next oestrus protudes from the surface of the ovary; the uterus begins to enlarge, it becomes congested and its glands become active; the mucous secretion from the vagina increases and contains cornified vaginal epithelial cells and an increasing number of leucocytes. This stage lasts in the mare about three days and is followed by

Oestrus, or heat, at which time the ripe ovum is shed from the Graafian follicle; the uterine glands are active and secrete much mucus; the mucous secretion from the vagina is abundant and contains cornified non-nucleated epithelial flakes and large numbers of leucocytes; the external genitalia are enlarged and all the external signs of heat are shown. This stage in the mare lasts about four-and-a-half days and is followed by

Met-oestrus, or pseudo-pregnancy, in which the epithelial cells remaining in the ruptured follicle undergo a rapid hypertrophy and become converted into the luteal cells of the corpus luteum; the blood vessels and glands of the uterine mucosa become very active and the whole organ increases in size; the mucous secretion from the vagina is reduced and contains normal vaginal epithelial cells and a few leucocytes. This stage lasts in the mare about eight days. The whole cycle is then repeated, taking in the mare an average of 22½ days and in the cow 21 days.

There are thus well-marked rhythmic changes taking place in the ovaries, uterus and vagina which must be co-ordinated if the sexual cycle is to follow its normal course and successful fertilisation of the ovum is to take place. It was supposed that the ovary itself was the organ which controlled the cycle but it now appears that this is not wholly correct. The first indication that other organs besides the gonads were involved in this process was the discovery that the successful implantation of the anterior lobe of the pituitary gland into infantile female animals was followed in a few days by the maturation of Graafian follicles, the development of corpora lutea and the other signs of oestrus. Conversely, the removal of the anterior lobe of the pituitary was followed by atrophy of the gonads in adult animals and a failure of their development in immature animals. Further work showed that it was possible to prepare extracts from the anterior lobe which induced similar effects on injection, and it became clear that the anterior pituitary lobe is responsible for initiating the sexual cycle by stimulating the ovary into activity. For this reason the hormone produced by the anterior

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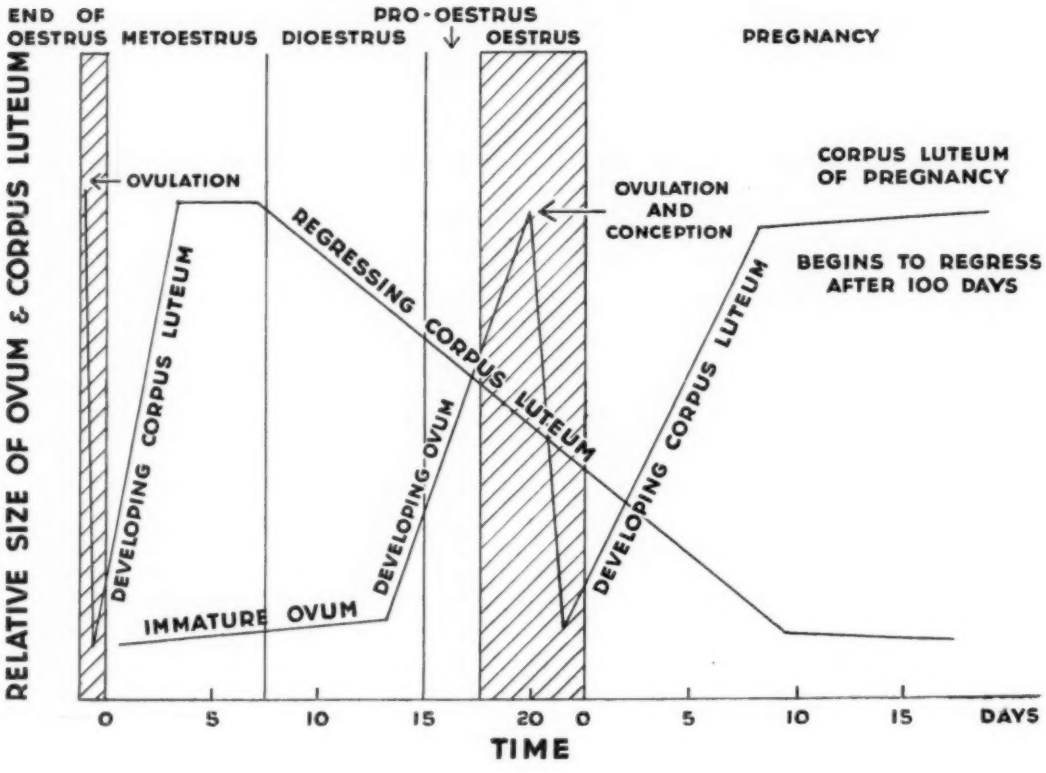
FIG. I SEXUAL CYCLE OF MARE

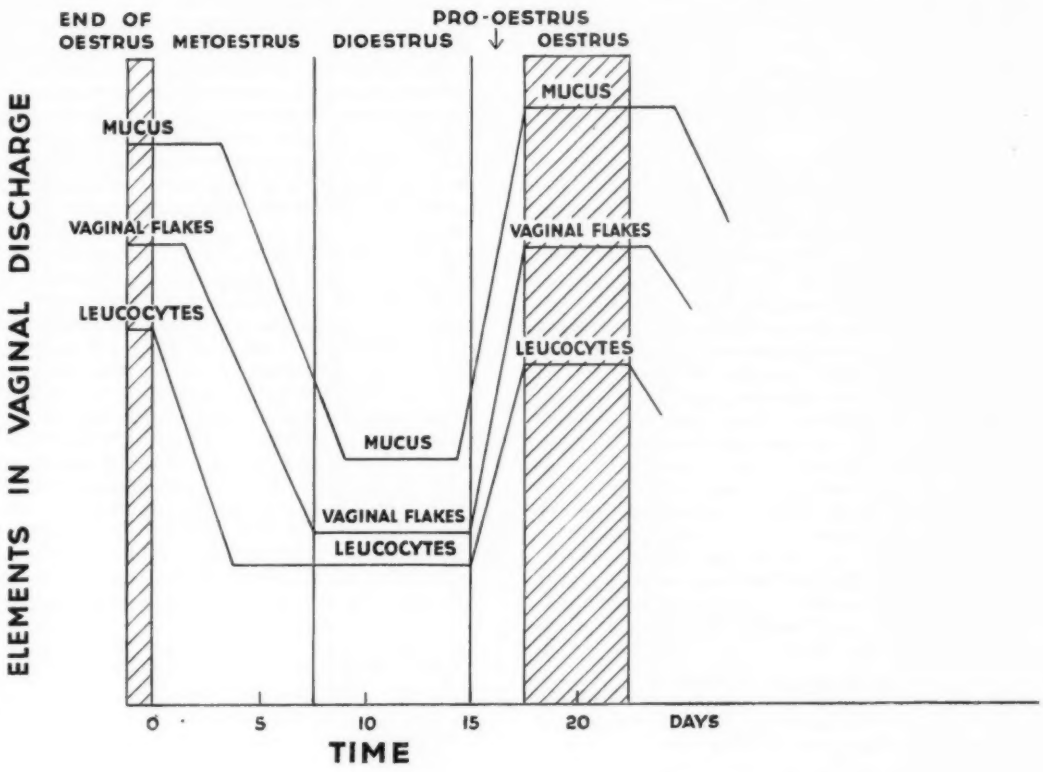


pituitary has been called the gonadotrophic hormone. Studies of the gonadotrophic properties of extracts made from the anterior pituitary led to the suggestion that such extracts could be divided into two fractions, one of which stimulated the development of the follicles and the other the formation of the corpus luteum, and they were named the follicle-stimulating hormone and the luteinising hormone. Recent work, however, suggests that these are purely hypothetical substances and may not in fact exist and that the gonadotrophic hormone controls the formation of the corpus luteum only indirectly by stimulating the ovary to secrete oestrone.

At present the knowledge concerning the control of the ovary by the anterior pituitary is very incomplete and the difficulties to be overcome before this knowledge can be extended are considerable. For one thing, gonadotrophic hormone has not yet been isolated in a pure state and it is impossible to assess with accuracy the amount of hormone in a given volume of extract. Since it appears that the hormone is produced in varying quantities during the different phases of the sexual cycle and also that it is comparatively easy to produce over-stimulation of the ovary by injections of the hormone, the question of dosage is of the greatest importance in any attempt to determine the normal activities of the anterior pituitary by injection of such extracts. Moreover, following injection, the hormone is rapidly destroyed. It has been estimated that 80 per cent. of injected hormone disappears within ten hours so that it can have very little time to exert its effect on the ovary. In addition, another difficulty has been encountered in that the repeated injection of the hormone induces the formation in the body of apparently specific protective substances, sometimes called anti-hormones, which inhibit the action of the hormone on the ovary.

It seems then that the effects seen after the successful transplantation of the anterior pituitary into immature animals are due both to the transplant and the resultant activity of the ovaries. The gonadotrophic hormone itself acts entirely on the ovaries and until they become active the reproductive organs remain

FIG. 2 STATE OF VAGINAL DISCHARGE OF MARE



quiescent in the di-oestrus phase of the cycle. With the elaboration of gonadotrophic hormone and the activation of the ovaries, the pro-oestrus stage of the cycle is reached. This lasts for a short time only and soon passes into the stage of oestrus or true heat. It is only at this stage that the female will accept the male.

It has been known for centuries that the removal of both ovaries completely inhibits the sexual cycle, and if the operation is performed before the age of puberty is reached, neither the accessory sex organs nor the secondary female characters develop. It is obvious, therefore, that the ovaries themselves must play an important part in the regulation of the cycle and they do this by virtue of a hormone which has been named oestrone, produced both by the Graafian follicles and the interstitial cells of the ovary. Injections of oestrone into immature female animals or animals with the ovaries removed induce enlargement of the uterus, development of the uterine glands and mucous membrane; thickening of the vaginal mucous membrane with cornification of the epithelial cells, all the external signs of heat and in young animals the development of the secondary female characteristics.

Oestrone can now be prepared in a crystalline form, its chemical constitution is known and numerous derivatives can be prepared from it, some of which appear to be more active than oestrone itself. It has been suggested that oestrone antagonises or neutralises in some way the action of gonadotrophic hormone and this is probably correct, but it has also been suggested that ovarian degeneration or hypertrophy is mainly a matter of the relationship between the amounts of gonadotrophic hormone and oestrone. This, however, is not at all certain and evidence is accumulating that the corpus luteum hormone and the secretion of other glands, particularly the thyroid, play an important part in ovarian hypertrophy or degeneration.

Oestrone, like gonadotrophic hormone, is rapidly destroyed or excreted when injected into the body, so that the effects of the administration of oestrogenic substances depend largely on the nature of the substance injected and the dosage employed.

Another substance with oestrogenic properties has been isolated from the urine of pregnant women and mares and has been given the name oestradiol. The origin of this substance is still obscure but it has now been suggested that it arises from the same sources as oestrone and it is possible that oestradiol is actually the oestrogenic hormone produced by the ovary itself.

With the production of oestrone or perhaps oestradiol in sufficient quantities by the ovaries, the stage of oestrus becomes fully developed. After the ovum is shed the corpus luteum grows rapidly, the signs of oestrus disappear and the met-oestrous phase of the cycle sets in.

It has now been established that the changes characteristic of met-oestrus are the result of the activities of a hormone, progesterone, produced by the corpus luteum. Progesterone has been isolated in a pure state and its chemical properties are known. Injections of extracts prepared from the corpus luteum inhibit further follicles from ripening, neutralise or in some way inhibit the action of oestrone, cause the proliferation of the uterine mucous membrane and also the development of the mammary gland but not the secretion of milk. Progesterone holds the distinction of being a purely female hormone, whereas gonadotrophic hormone, oestrone and the so-called male hormone, testosterone, are ambisexual, *i.e.*, they occur in both male and female animals.

It appears, therefore, that progesterone induces the met-oestrous stage of the sexual cycle, but as the corpus luteum does not remain active for very long and soon undergoes degeneration, the secretion of progesterone also stops and the di-oestrous phase is again reached.

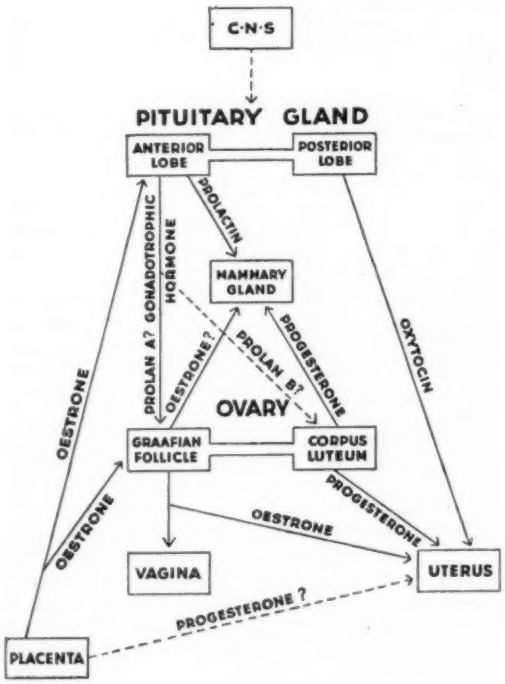
On the other hand, if successful fertilisation of the ovum takes place the whole sexual cycle is interrupted and the corpus luteum, instead of undergoing regression, persists and remains active. From this and from the fact that removal of the corpus luteum during pregnancy is often followed by abortion, it is reasonable to suppose that progesterone is essential for the continuance of pregnancy and is responsible for bringing about the suspension of the sexual cycle. As has been said, one of the activities of progesterone is to induce the proliferation of the uterine mucous membrane; the purpose of this is to prepare the mucous membrane for the implantation of the fertilised ovum. Whether the interaction of other hormones as well as progesterone is necessary for the continuance of pregnancy is still a very involved question. The striking fact is that the amount of oestrone and gonadotrophic hormone circulating in the blood rises considerably in the majority of animals. This is certainly true of pregnant women and mares. In the case of the former, both the hormones appear in excess in the urine during pregnancy, in the latter although the amount of gonadotrophic hormone in the blood increases during pregnancy, it is not excreted as such in the urine and is probably destroyed in the body; on the other hand, the amount of oestrone in the urine steadily increases throughout pregnancy. In both cases, the increased production of the hormones has stopped at parturition and their presence can no longer be detected in the blood or urine. It is upon these facts that all the so-called pregnancy tests are based.

Another complication to any consideration of the maintenance of pregnancy is added by the fact that the mechanism seems to vary in different species. Thus in cows and rabbits both the anterior pituitary and the corpus luteum appear to be necessary, whereas in mares removal of both the anterior pituitary and the corpus luteum is not followed by abortion, at any rate in the later stages of pregnancy; perhaps in this case the placenta takes over the functions of these organs. It may be that both the gonadotrophic hormone and oestrone are necessary for the continued production of progesterone, and to ensure that this shall be accomplished increased amounts of these substances are produced during pregnancy, any excess being destroyed in the body or excreted in the urine. That oestrone is of especial importance is indicated by the fact that the placenta produces large quantities of the hormone during pregnancy, and I have made the observation that mares which breed regularly and are easy to get into foal excrete a considerable amount of oestrone in the urine in the early, as well as in the later, stages of pregnancy. The suggestion has also been made that the placenta elaborates progesterone as well as oestrone during pregnancy, but I am not sure whether this has been confirmed or not.

It is remarkable that the uterus should remain quiescent throughout pregnancy and then suddenly become extremely active at parturition. It is probable, but by no means certain, that progesterone reduces the tone of uterine muscle and it therefore cannot become active until the secretion of progesterone ceases. This occurs at the time of parturition when the corpus luteum of pregnancy has undergone considerable regression. At the same time the posterior lobe of the pituitary becomes active and secretes an increased amount of oxytocin which induces vigorous contractions of uterine muscle. These effects, *i.e.*, the increased tone of the uterine muscle and perhaps an increase in its sensitivity to oxytocin and an increased production of this hormone on the part of the posterior pituitary, ensure that the uterine muscle becomes sufficiently active to bring about parturition.

Finally, although the mammary gland is a true cutaneous gland, it functions in perfect harmony with the reproductive organs and may be classed as an accessory sex gland. It now appears that this harmony is largely brought about by the interaction of hormones, one of which is progesterone. This is responsible for inducing the rapid development of the alveoli which takes place not only towards the end of pregnancy but also, although to a lesser extent, during met-oestrus. Oestrone also appears to be necessary for the full development of the mammary gland but whether it acts directly on the gland or only indirectly via the ovary is not yet clear. It seems that oestrone inhibits the actual secretion of milk once this has begun but this is not to say that oestrone is unnecessary for or detrimental to the development of the glandular tissue. At parturition, the oestrone and progesterone level falls and this may permit the lactogenic hormone, prolactin, produced by the anterior pituitary to induce the secretion of milk. Injections of prolactin only excite the secretion of milk provided that the mammary gland is fully developed. It may be that the act of suckling and the consequent emptying of the milk sinuses is sufficient to ensure the continuance of milk secretion and that no further hormonic control is necessary.

FIG. 3 INTER-RELATION OF SEX HORMONES



On the other hand, the suggestion has been made that the act of suckling reflexly stimulates the secretion of prolactin which in turn induces further milk secretion. This, however, remains to be proved.

I have tried to put before you a general outline of the mechanism by which the female sexual cycle is regulated in the higher animals. The principles apply to the majority of the animals with which the veterinarian has to deal but it is becoming more and more apparent that each species shows a modification of the general arrangement to suit its own requirements not only with regard to the time relations of the cycle but also with regard to the production of the various sex hormones themselves, and I might also say that there are even individual variations in this respect. However that may be, it is clear that for a complete cycle to take place, the various hormones must be produced in the right quantity and at the right time, and they interact one with the other to induce the required effects. It must not be forgotten that, after all, a hormone acts simply as a stimulus to a living cell or group of cells and it is the cell which produces the reaction. It is thus not surprising that other substances besides, say, oestrone can induce changes which we recognise as heat, or that a particular hormone induces one effect in one organ and a different effect in another. The cell and its metabolism are just as important, if not more so, for the smooth working of the cycle as the sex hormones. It is obvious that no matter what or how strong the stimulus may be, if the cells themselves are out of gear they cannot and will not give a normal response to that stimulus, be it a hormone or anything else.

There is also another factor which may play a greater part in the regulation of the female sexual cycle than is generally supposed and that is that the central nervous system may take a hand in the matter. It has been established that, at any rate in man, there is what may be called a genital centre in the medulla which perhaps regulates the production of the various hormones and may directly influence the reproductive organs themselves. There is no reason to suppose that such a centre does not exist in animals also. We may conclude, therefore, that any attempt to influence the female sexual cycle by injection of hormone preparations is not likely to succeed until the whole intricate mechanism is more fully understood and, I may add, the nature of the preparations themselves.

Discussion

Professor J. J. O'Connor said that he felt that he was filling a gap in opening the discussion on Professor Nicholson's paper as he had

expected that a country practitioner from a breeding district would have been chosen for the purpose.

Professor O'Connor proceeded: We are all too familiar with the great losses sustained by breeders from sterility and barrenness in large animals and with the difficulties in dealing successfully with these conditions. We are, therefore, anxious to learn all we can on the subject of breeding. Naturally the first thing to do is thoroughly to study the anatomy, histology and physiology of the reproductive organs so as to be enlightened on the fundamental principles controlling reproduction.

There is no more important phase in the process of breeding than the sexual cycle. Therefore any advance in our knowledge of the way in which it is regulated and controlled is very welcome. Without an academic study of the science of breeding it would be impossible to establish practical methods of dealing with the subject. Professor Nicholson has done a good service in giving us such an excellent review of the knowledge already acquired on the periods of the sexual cycle, indicating how they can be recognised and the duration of each period.

It is of great practical importance to be well acquainted with these points so as to be able to recognise the true oestral period and to know when to mate the female. Barrenness is frequently due to missing an ovulation period and having the animal served during a false oestral period, when outward symptoms of oestrus are shown although ovulation has not occurred.

The action of hormones in affecting the sexual cycle is very interesting and one might expect that practical results could be obtained from a knowledge of their action. The injection into the animal's system of an extract from the anterior lobe of the pituitary gland might be expected to induce ovulation in a case where it does not recur regularly. The regulation of the dose, however, seems difficult and is important because excessive hormone stimulation may result when a too large dose is administered, defeating the object of the injection. Moreover Professor Nicholson informs us that the gonadotrophic hormone introduced from outside the body is destroyed within ten hours before it has had time to stimulate the ovary, and that repeated injection of the hormone produces a specific protective substance sometimes called anti-hormone, inhibiting the action of hormones. This knowledge makes one rather sceptical about the utility of hormone therapy in cases of barrenness or sterility; nevertheless, the administration of the hormone progesterone, whose function seems to be to implant the fertilised ovum in the uterus and ensure the continuance of pregnancy, is claimed to have been used with success in the human subject in the prevention of abortion or miscarriage to which the patient had previously been subject.

Professor Nicholson emphasises the striking fact that oestrone and the gonadotrophic hormone are present in quantity in the blood of pregnant mares and pregnant women and that oestrone alone appears in excess in the urine of the pregnant mare, forming the basis of the reliable pregnancy test in that animal, a demonstration of which is to be given this evening by Professor Nicholson. This is a very valuable practical result of the academic study of the sexual cycle in the mare.

It is evident from what Professor Nicholson has said about the changes occurring in the vagina during the sexual cycle that a careful examination of the passage may be necessary to ascertain the stage of ovulation, when the female is ready to receive the male. Great stress is laid on this point in an article by the American veterinarian Caslick in the *Cornell Veterinarian* of April last. He insists that the chief sign of the absence of true oestrus is the dry vagina. Consequently he strongly advises the routine examination of the vagina of mares that fail to conceive after an apparently normal service during what appears to be an ordinary oestral period, and recommends the following procedures:—

(1) Ascertain whether the tail is moist from vaginal secretion.

(2) Spread the lips of the vulva with the hands to see if there is secretion on the vaginal floor.

(3) Observe whether the vulva is relaxed or contracted: relaxation does not necessarily indicate oestrus—it is often relaxed in the pregnant mare.

(4) Use a dry vaginal speculum. If secretion is present the instrument glides on the vaginal mucous membrane, whereas if it is absent it drags the membrane.

(5) Notice that the cervix is relaxed and congested during oestrus and that there may be some oedema in the external cervical folds. The cervix may, however, be contracted although oestrus is present.

The sexual cycle comprises two main periods, *viz.*, in heat (oestrus) and out of heat (di-oestrus). The di-oestrus period is subdivided into (1) the post-oestrus period; (2) the met-oestrus period; (3) the pro-oestrus period. There is great variation in the oestral period as as expressed to the teaser. There are many false oestral periods and without vaginal examination it would be hard to say the length of the true oestral period. It is difficult to know how long a mare may remain in oestrus after service and still be in foal.

The post-oestrus period is recognised by a dry vagina and gradual loss of the congestion of oestrus, and by the cervix becoming contracted. Its estimated duration is five days.

In the met-oestrus period the vaginal mucous membrane is pale; the normal secretion increases towards the end of the period, which lasts about twelve days.

The pro-oestrus period occupies a space of three days prior to the oestrus period.

The first sign of oestrous on vaginal examination is softening of the normal vaginal secretion and relaxation of the cervix. The vaginal secretion then becomes milky and eventually appears in the form of a clear mucus.

There are, however, many variations in the condition of the vagina due to derangement of the sexual cycle. A pregnant mare has been found in apparent oestrus five times during one breeding season.

Anoestrus is rare in the thoroughbred mare during the breeding season; out of 1,200 mares examined by Caslick there were only four which showed no ovulation within one month. Ovulation may occur without outward symptoms of oestrus and a mare may be negative to the teaser although in season.

In Caslick's opinion the chief causes of barrenness in mares are the short breeding season, genital infections and abnormal oestrus, the cases due to the latter cause being more numerous than all others combined.

If a mare does not become pregnant during the four months between February 15th and June 15th, she will be barren for the following year. The majority of foaling mares are served after April 1st: hence no opportunity must be missed to recognise the ovulation period. There are usually three normal oestrus periods for one pregnancy. The ovulation period may escape notice when it occurs during an abnormally long false oestral period if vaginal examinations are not made, but frequent vaginal handling is objectionable on the ground that it may lead to infection, in much the same way as wind-sucking through the vagina. The mare may be served several times without conceiving owing to the services not coinciding with ovulation.

Professor Nicholson's paper forms an excellent basis for discussion of the important subject of breeding and we owe him a debt of gratitude for the masterly way in which he has dealt with its scientific aspect.

Mr. E. V. Kelly (Kells, Co. Meath) congratulated Professor Nicholson on his excellent paper and said it was of great importance that the practitioner engaged in treating sterility should avail himself of every opportunity, such as this, to try to understand what was known of the physiology of oestrus. The practitioner was concerned with the irregular oestral cycle and this was a very common condition in the mare and probably the greatest source of trouble to breeders. Mares with a prolonged period and those showing no apparent oestrus at all were very difficult to deal with. The speaker found that the last type of case was getting more common every year. Some work done by Caslick and others pointed to the use of vaginal examination in the diagnosis of oestrus in the mare. The speaker had tried this in a couple of cases but had not yet had enough experience of it to give an opinion on its use. It was hoped during the coming season to try it more extensively.

Caslick's report certainly held out great hope to the practitioner who became competent in vaginal examination. An important statement by Caslick from observation of a big number of mares was as follows: "I want it to be thoroughly understood that the ovary of the mare generally produces normal ova at intervals, regardless of how the mare may act towards the male. This is absolutely contrary to our heretofore accepted idea of normal ovarian function in the mare. Whether the mare shows a long continuous heat period or no heat period at all the ovary goes on producing normal ova at time intervals comparable to the mare with regular heat periods. When the time comes for the ovum to be shed from the ovary, this phenomenon causes such physiological changes in the vagina, cervix and uterus that if one is versed in vaginal work the mare is unable to fool you even though she is fooling the male by either being in heat too much or not showing any heat periods at all."

The hormonal treatment of mares not coming in use was a rational one, but the speaker gathered from Professor Nicholson that it was purely experimental and of doubtful value. The speaker was convinced that prolan had no influence whatever in bringing about oestrus in the mare. He had used it in a great number of cases and the results, even with double the dose recommended by the makers, led him to believe that it was quite valueless. At the end of the last breeding season he was asked to inject three mares at one stud which had not come in use. He had only two double doses of prolan available so only two of the mares were injected. The mare not injected was in use in about three days. The two mares injected did not come in use at all. Some practitioners spoke well of hormone treatment, but in the opinion of the speaker, the good results claimed were probably pure chance. It was hoped that further research work would make hormone treatment of more value.

Professor Nicholson, he thought, had omitted one important point, and that was the time during oestrus at which ovulation occurs. Probably nothing definite was known as to this. In the cow with a normal short period it probably was of no practical importance, but that was not so in the mare where a normal oestral period might last six or more days. They understood that when the ovum was shed it died very quickly if not fertilised. The spermatozoa might remain active for probably about two days. The period of activity of the latter probably depended on the virility of the stallion and on other circumstances. It was easy to understand that a mare might be "missed" if not covered at the proper time. The speaker was of opinion that a number of mares are barren owing to faulty stud management in this respect. For this reason he recommended service every two or three days during the normal oestral period in the mare. Heretofore they had understood that the ovum was shed towards the end of the period and therefore breeders looked on service

when the mare was "going out" as the most favourable time. Caslick was of opinion that the fore part of the period was the most favourable, but the Russian workers on artificial insemination reported a very low percentage of fertility unless repeated inseminations were resorted to during the oestral period in the mare.

Professor T. G. Browne, in complimenting Dr. Nicholson on his paper, said that they had just heard an excellent account of the physiology of the sexual cycle in the female. This would enable them to understand better the basic principles of the treatment of functional sterility in the female with certain biological products. If each of the hormones of which Dr. Nicholson had spoken was an independent clear-cut agent then the whole matter of treatment would be straightforward and simple and they would know exactly when such treatment was indicated. These hormones, however, were all linked up with one another both in their origin and in their actions. They had just been told that oestrin was produced in the ovary, and also, during pregnancy, in the placenta, and that the production of this hormone was governed by the gonadotrophic hormone from the anterior pituitary. Furthermore, the production of the anterior pituitary hormone was in turn governed, at least to some extent, by the thyroid gland, and some authorities even stated that the whole sexual cycle was bound up in some mysterious way with the hormones from the suprarenal bodies. It would thus appear that the administration of any of these hormones, in the form of biological products, for the treatment of functional sterility, could be nothing more than a mere "shot in the dark." It was well known that good results had been claimed for prolan (anterior pituitary hormone) in the treatment of functional sterility in the cow and mare, and he was aware of one breeder of thoroughbred stock who claimed excellent results for treatment with thyroid extract. Another agent of quite a different category for which good results had been claimed by many was vitamin E by the administration of wheat-germ oil. However, so far as he was aware, no properly controlled experiments on the larger animals had been carried out with any of these agents. The experiments which had been performed had been on rats, mice and guinea-pigs, and it was doubtful if the results of these experiments could be applied to the larger animals in practice. At best the action of hormones which were administered as biological products could be only temporary since they were rapidly excreted from the body. The administration would thus require to be repeated at short intervals.

In his opinion, when functional sterility existed in the female it would be much more logical to approach the matter from the aspect of the external influences which may operate to bring about abnormal sexual cycles. They had learned from the paper that the sexual cycle in the female was a very complicated and delicate process and it was well known that it was subject to many influences such as nutrition, environment, climate, light, soil, exercise, etc. A considerable amount of research work in the larger animals was still necessary in order to ascertain exactly the extent to which each of these influences operated in the production of abnormal sexual cycles. A certain amount of work had been done along these lines, chiefly by Quinlan, Maré and Rouse in South Africa, and by Hammond in England. In South Africa it was shown that a large proportion of the sterility in cows and sheep could be got rid of by feeding bone meal and proteins, the sterility in these cases having been due to a phosphorus deficiency. Another interesting point brought out by Quinlan during his experiments was that if young ewes after reaching sexual maturity were prevented from breeding for a few years their fertility afterwards became considerably reduced. It would, therefore, appear that the longer a young female animal of sexual maturity remained sterile the less were the chances of such an animal ever becoming a satisfactory breeder even though the original cause of the sterility might have been eliminated.

Changes of environment might cause a temporary sterility, apparently due to psychological effects. A similar psychological effect had been observed in the male to cause a temporary sterility in newly imported bulls.

It was generally believed that a very large proportion of the sterility in this country was due to infection causing an endometritis. Were they quite certain, however, that such infection was not in many cases merely secondary to some of the external influences which had just been mentioned? The adverse effects of some of these influences might reduce the resistance of the body and thus enable the hitherto dormant infection to gain a foothold.

Regarding the removal of a persistent corpus luteum (of oestrus) or of a persistent Graafian follicle, the facility with which this could be done through the rectum would depend on circumstances.

In the cow it was well known that the fully developed corpus luteum (of oestrus) might not atrophy but persist and thus prevent the onset of the next oestral period. In such a case the persistent corpus luteum should be expressed from the ovary by manipulation through the rectum. In some cases the corpus projected prominently on the surface of the ovary with a constricted base and it was very easily enucleated, but in other cases its base was broad and looked like a part of the ovary itself, and here complete enucleation was difficult. It was well to remember that damage might be done both to the ovary and to the rectum by using too much force in expressing the corpus luteum. The same might be said in regard to the rupturing, *per rectum*, of a persistent Graafian follicle. Sometimes the follicle projected prominently and its rupture was easy, but in other cases it was more deeply embedded and its rupture was difficult.

In the mare it would appear that persistent corpus luteum was less common than in the cow, but persistent Graafian follicles resulting in cystic ovaries were quite commonly met with. Both the corpus luteum and the Graafian follicles were more deeply embedded in the ovaries and were, therefore, more difficult to deal with *per rectum* in the mare than in the cow. Furthermore, the ovaries were further forward in the mare, being about two feet distant from the anus, whereas in the cow their distance from the anus was only about 15 to 18 inches.

Mr. P. E. Mullaney stated that he wished to associate himself with the other speakers in congratulating Professor Nicholson on his excellent paper and instructive diagrams, and to thank Professor O'Connor for his very practical additions. He would refer briefly to two statements in the paper. The first related to the difficulties that were encountered in biological experiments with anterior pituitary

extract, owing to the production of anti-substances by the experimental animals. Difficulties might, perhaps, be expected, and yet the production of anti-substances was extremely interesting in view of the fact that other glandular extracts did not behave in a similar way under similar circumstances.

The second dealt with the hormone oestrone. Could this hormone be considered an absolutely harmless therapeutic agent? Its close relation to certain carcinogenic agents was well known, although it must be stated that the experiments as to its property of producing malignancy in the mammary glands had been confined to the small laboratory animals. In this connection one wondered if endocrine disturbance was in any way responsible for the variation in the incidence of malignant neoplasia in the mammary glands in the different species of domestic animals.

The whole subject was extremely complicated, and for the simplicity with which it had been presented to them that night the speaker deserved their sincerest thanks.

The Reply

The speaker, in reply, particularly thanked Professor O'Connor for opening the discussion and regretted that there was insufficient time to answer individually each of the points which he and other speakers had raised.

From the viewpoint of the practical breeder, the time of ovulation was all-important, irrespective of the other changes taking place during the sexual cycle. The mechanism of ovulation, however, was not fully understood. The consensus of opinion seemed to be that in mares it took place towards the end of oestrum and that the ovum remained viable for about 30 hours; on the other hand, spermatozoa did not live in the genital tract of the female for much longer than twelve hours. The development of mature ova appeared to be rather independent of the other changes taking place in the gonads, since follicular development and regression took place in a somewhat rhythmic manner long before the age of puberty was reached.

The failures reported after injections of prolan in cases of sterility might be due to a variety of causes; for example, incorrect dosage, injection made at an unsuitable point in the sexual cycle, unsuitable case for such treatment, etc. In any case, the present methods of standardisation of extracts of anterior pituitary left much to be desired. The anti-hormones which appeared after repeated injections of anterior pituitary extracts were in no way related to anti-bodies but seemed to be anti-ferments in Abderhalden's sense. No evidence had been obtained to show that oestrone could induce cancer or that it was in any way associated with mammary cancer in bitches.

With regard to the diagnosis of pregnancy, in mares oestrone was the only hormone which appeared in the urine in any quantity during pregnancy. Cuboni's chemical reaction appeared to give very satisfactory results after about the 120th day, and in some cases pregnancy had been diagnosed as early as the 30th day. This, however, could not always be accomplished and the Allen-Doisey test or the Aschheim-Zondek test using blood serum, would probably give better results during the early stages of pregnancy. The chief difficulty with regard to Cuboni's test was that the reaction could only be read in direct sunlight. This, however, had been overcome by using a high intensity lamp with a special filter.

The lamp was demonstrated together with positive and negative reactions.

FURTHER RECOLLECTIONS OF THE "NATIONAL" CONFERENCE OF 1900

E. P. EDWARDS, M.R.C.V.S.,

Bournemouth

As one who attended the above congress may I say how much I enjoyed reading the delightful reminiscences of Mr. Gooch in your issue of February 11th, and may I be allowed briefly to supplement them.

It was one of the first congresses I attended, and of all it has been my good fortune to go to since, none has excelled and few have equalled it for the warmth of welcome, and almost princely hospitality extended to us on all sides throughout our stay.

The social side of the earlier congress was probably given a larger place than is possible in our more strenuous times, but whatever may have been the drawbacks to the scientific aspects, there is no denying the spirit of carefree enjoyment which pervaded it in those more spacious days.

But to "reminisce" with Mr. Gooch; this congress was very fortunate in having lovely weather throughout, for although we were greeted by a severe thunderstorm at Killarney, this came obligingly after we were safely in our hotels, and since it was followed by a brilliant morning could be regarded as a blessing in disguise, and a refreshment of the relaxing climate.

Mr. Gooch refers to our invitation to the theatre in Dublin "where some noted actress was playing"; this was Mrs. Patrick Campbell, and I think the play was "The Second Mrs. Tanqueray."

At Glendalough the late Mr. Lloyd, of Sheffield, and myself walked, during the "go-as-you-please" time, on the cliffs to the left of the Lough, and we discovered that the village of Blarney in County Cork has a rival "Blarney Stone" here in County Wicklow. It is a jutting rock well below the cliff top, and a hefty fellow was there, who for a "consideration" offered to hold us by the legs whilst we imprinted on it the salute which was to confer the "comether" gift upon us for the rest of our lives. However, one glance at the fearsome drop into the lake below was enough to make us resist the persuasive eloquence he seemed to have acquired, or which more probably was "just the nature of the baste."

At Killarney I was one of those who stayed at the Great Southern Hotel and who was taken

ill. Whatever the cause of the trouble, the acute "tummy ache" I suffered, aroused sympathies with my cases of colic at home such as I had never felt before, and the feeling has never faded since. A doctor saw me among others, including, I think, the President, Mr. J. Abson, similarly afflicted, and next morning most of us were better, though shaky. I never think of my Killarney doctor without a smile.

It may be remembered that Mark Twain relates that at a resort in Pennsylvania he found they had altered the Lord's Prayer, and that in his hotel there was a printed card over his bed which ran: "Oh Lord send us this day our Daily Stranger, for without him we cannot live"—and, judging by the truly magnificent fee this doctor charged me, he also must have adopted and approved of this revised version of the cash value of the "stranger within the gates."

The Irish people as a race are famed for their ready wit and gifts of repartee, of which on this trip I met with two genuine samples which may rank with the typical one quoted by Mr. Gooch of the unlucky—or lucky—driver who broke his collarbone.

On the drive through the "Devil's Glen" I was in a wagonette, and on the box seat was Mr. William Hunting, who appeared to be enjoying himself hugely judging by the lively talk between the driver and himself, and the many chuckles we heard. At the steep hill we all got out and I sidled up to Mr. Hunting, walking with the jarvey, who handled the loose reins. Looking around at the glorious scene, Hunting said: "Well, Pat, this is a very beautiful place, but why do you call it the Devil's Glen: does he live here?" In a flash came the answer: "Shure no sor, he lives in London, with all the other absentee landlords." To appreciate the aptness of the repartee it should be explained that at this period of the campaign for Irish Home Rule, the absentee landlord was a poignant figure, and we must also note that the shrewd jarvey had diagnosed Hunting to be a Londoner.

On the excursion to Killarney lakes I took a pony to ride through the Gap of Dunloe, and I handed my new mackintosh and a camera to a very ragged lad in charge of it, quite assured of their safety when I looked into his twinkling and humorous eyes. He was barefooted and kept pace with me most of the way and talking all the time in his lovely brogue. To my remark, that with so many visitors coming to the lakes he must make quite a lot of money in the summer, he replied: "Aw yes sor, in the summer we makes a bit, but the winters are a long time going by." "And how do you live in the winter?" asked I. Without hesitation came the answer: "Shure, sor, we lives like the bees"—a reply having the merit of that brevity said to be the soul of wit, and a delicate subtlety of its own.

Going down the Gap I suddenly heard a lilting tune being played on a violin, and seemingly high up on the left-hand side of the ravine, but no player was in sight. Several times the music stopped suddenly and as suddenly began again, thus adding to my mystification. My "groom of the laughing eyes" twitted me that I could see no one where he pretended he could see the man "as plain as plain." We moved on and presently the fiddler was discovered standing in a litttle gap on the right side of the road I was on, and playing so softly that it was difficult to believe that he was the producer of the volume of sound which the rocky cliffs far above returned to our ears. I was told that this is one of the most remarkable and perfect echoes in the world, and that it is unique also in that it is only produced to perfection from the exact spot at which the player stood. At this spot, not only was the muse provided, but Bacchus also was there so as to combine "wine and song," for we were quite openly invited, nay pressed, to drink a glass of "the rale Potheen begorra." We must have seen the Lakes at their best on this day, for the air was clear and the sky brilliant, but their beauty and the grandeur of the Macgillycuddy Reeks which form their background are best left to the imagination, or perhaps in some measure may be conceived on hearing the lovely song "Killarney" with its haunting melody, sung by an Irishman.

My little camera proved useful on this trip, and I was able to give Mr. Hunting the negatives of a number of "snaps" which were reproduced in the Congress number of the *Record*.

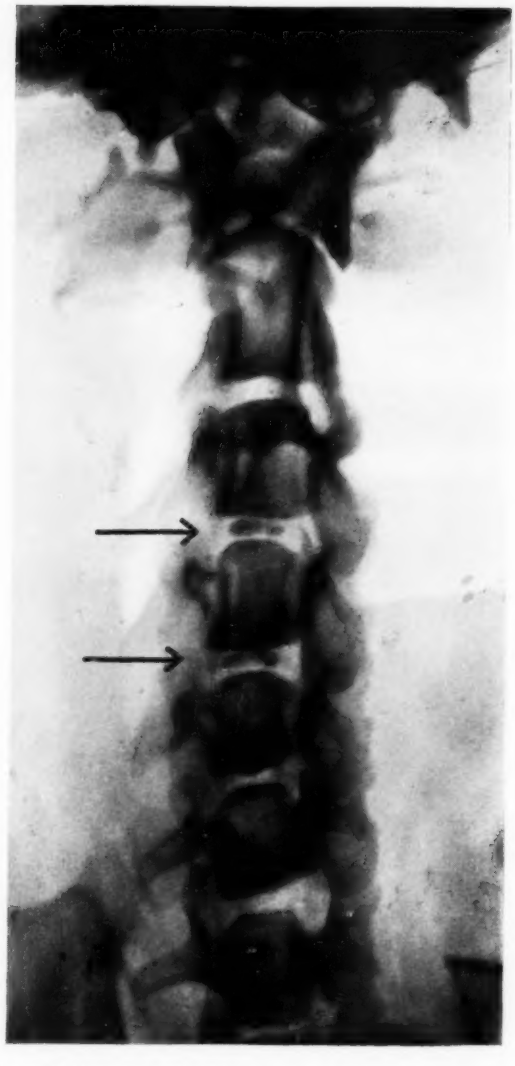
Although our *Record* is a serious scientific journal, may I express the hope that the article by Mr. Gooch may be the forerunner of others in similar "lighter vein" and also the belief, that if space can be spared, Mr. Editor, they would be widely welcomed.

One may feel sure that the daily annals of our professional life abound with events tinged with the humour, the pathos and even the minor tragedies of life, and they would seem to merit a place in our contemporary literature, ere they be for ever lost.

Senor Federico E. Bullrich, who has for many years officiated at the principal sales of British pedigree bulls in Buenos Aires, has accepted an invitation of the Royal Agricultural Society to act as judge in the Shorthorn Bull classes at the Centenary Show to be held at Windsor next July.

* * * * *

At a recent meeting Berkshire Agricultural Committee decided that in future cases of foot-and-mouth disease affecting Berkshire no licences will be issued to markets in the affected area for the sale of cattle for immediate slaughter until a week after the outbreak.



Calcification of the intervertebral discs between the third and fourth, and the fourth and fifth cervical vertebrae of a Pekingese.

CLINICAL COMMUNICATIONS

Calcification of the Intervertebral Discs

HAMILTON KIRK, M.R.C.V.S.,
London

Every canine practitioner will be familiar with the dog which manifests mysterious pains in the back, or hyperaesthesia, sometimes of a fleeting nature, but generally acute. One finds a difficulty in differential diagnosis of such cases, and may regard the attacks either as due to pachymeningitis, muscular rheumatism, vertebral injury, spinal arthritis, vertebral tuberculosis, or perhaps even enostosis intervertebralis. Pachymeningitis, in which there is pain in certain movements of the body, all of which are cautious, stiff and stilty, has also been regarded as rheumatism, and it is quite likely that a true diagnosis can only be based upon *post-mortem* examination and the discovery of thin osseous scales in the dura mater.

Mysterious pains are often associated with diseases of the spinal cord or of its membranes. Ossifying pachymeningitis, for instance, is frequently responsible for hyperaesthesia of the skin and the occurrence of unaccountable pain should a dog be lightly stroked or picked up. At other times such actions may not produce this effect; but a dog so diseased may cry out in pain when nobody has handled it at all, and continue to shriek for a few minutes, to everyone's dismay.

In their description of ossifying pachymeningitis, Hutyra and Marek have portrayed a graphic picture of what practitioners so often encounter among their more elderly canine patients:—

"The first symptom observed is usually evidence of pain owing to the stretching of sensory fibres with every movement of the vertebral column. Animals sometimes cry out without any apparent cause, and still more when getting up, lying down or making other movements. About the same time, but sometimes earlier and at other times later, motor disturbances are observed. These may, for a comparatively long time, be due to pain or to muscular spasms caused by pain.

"The animal is easily fatigued, is unwilling to go up or down stairs, and does so with difficulty, lies down cautiously and is very averse to moving the head or neck. The gait may be more or less stiff, and whilst these symptoms may persist for a variable length of time, they may completely disappear, the animal appearing perfectly healthy during the interval. Paralysis of the fore or hind legs may supervene later."

The above recital of symptoms almost exactly agreed with those observed in the case of a Pekingese-spaniel examined by the writer, and although in radiographs of this dog, ossification of the intervertebral discs was found, one could not rule out the possible co-existence of pachymeningitis. Probably both conditions were present.

In the case referred to above, the Pekingese was three years old, and six months earlier, had a short bout of screaming—obviously due to pain. At the termination of the attack the dog looked frightened and definitely seemed afraid to move. During the next five months, to touch the dog about the neck or chest would occasionally cause it to cry out, arch its back, and keep the head and neck rigid as though fearing to move. It even refrained from defaecating because, apparently, it disliked adopting the attitude essential to that act.

Passive movements of the spine, or percussion of the spinous processes, caused, in some instances, symptoms of pain; but the position of the pain could not be localised. The dog resented being turned upon its side during such attacks and there seemed a possibility that movement of the spinal column might be the provoking factor. Occasionally the dog had seemed stiff in the limbs, tottery, and to dislike movement, but there had never been any paralysis. In the intervals of freedom from pain the animal was lively and apparently quite normal.

Five-and-a-half months after the first attack, there was another, followed a fortnight later, by a third. The owner began to be worried about it, and consulted one or two veterinary surgeons, one of whom suggested radiography. The writer carried this out and discovered as a result, calcification of the intervertebral discs between the third and fourth, and the fourth and fifth, cervical vertebrae (*see radiograph*).

As the disease was in its early stages and was so far confined to only two discs, it was not surprising that paralysis had not as yet appeared. There seemed some possibility that it might do so in due course.

According to Hutyra and Marek, intervertebral ossification develops as a result of osteoperiostitis in the neighbourhood of the intervertebral discs. The growths vary in size and project into the vertebral canal, setting up a condition known as *enostosis intervertebralis*, and causing compression of the cord.

Inflammation of the intervertebral discs with calcification caused intense pain in a cocker spaniel which was the subject of a clinical article by Schnelle (of Boston, U.S.A.) in the *North American Veterinarian*, vol. xix, Nos. 2 and 3.

Such cases are by no means uncommon, and it seems more than likely that, in a majority of those which are not X-rayed, the diagnosis may be at fault.

Sodium Iodide Treatment of Actinomycosis and Actinobacillosis

A. J. BAXTER, M.R.C.V.S.,
Lechlade, Glos.

My results have not been at all good in treating actinomycosis with sodium iodide intravenously, in contrast to the case reported by Mr. C. W. Abrams in the *Veterinary Record* of November 26th, 1938. Incidentally, I am wondering if his case was really actinomycosis or was actinobacillosis affecting the cheek. Clinically, I am working on the assumption that actinobacillosis affects the soft structures of the head, and actinomycosis the bony structures, as a general rule. Up to the present time I have not supplemented the intravenous sodium iodide treatment with the local treatment, carried out by others, of lancing and curetting the actual lesion to allow drainage.

Case AK, when first seen, had a hard actinomycotic swelling, about the size of half a tangerine orange. A few days later, on April 7th, 1938, this small dairy Shorthorn (first calver) received sodium iodide ℥i in one pint of water intravenously. The same quantity was injected on April 20th, when the swelling was distinctly bigger. After that she showed some signs of iodism and the case was given up, as regards treatment, but I have seen her off and on since then. This swelling has gradually increased, and a week or so back was the size of two Jaffa oranges placed end to end. I think that there was a slowing up of the rapidity of growth in this case, but treatment could not be pushed any further.

Case HD was a four- to five-year-old dairy Shorthorn bull in poor condition which had a cauliflower-like growth as well as three to four missing teeth on the left lower jaw. Daily drenching with potassium iodide ℥i was tried first for twelve days. As the growth continued steadily to get larger, sodium iodide ℥iss was given intravenously, but the condition became worse and he was shortly afterwards slaughtered.

Sodium iodide, administered intravenously, as a treatment for actinobacillosis, is certainly worth trying in some cases, but I doubt if it is any real improvement over daily drenching with potassium iodide for the average case. The time taken to produce a cure is about the same for both methods as far as my experience goes.

Case HO is very interesting. This was a roan two-year-old dairy Shorthorn heifer which, when examined on February 21st, 1938, revealed almost complete involvement of the tongue except the tip. She then received daily doses of potassium iodide ℥i by drench for 24 days. During this time the condition gradually became worse, the tongue became practically rigid, and iodism was very marked. After a few days' rest, sodium iodide ℥vi in one pint of water was given intravenously on March 19th. The condition of the tongue on April 2nd was about the same and a further 6 drachms of sodium iodide were given intravenously. Shortly after this iodism was so intense that further iodine treatment was ruled out for the time being. This case was missed for a few weeks (owing, as far as I remember, to the occurrence in the district of an outbreak of foot-and-mouth disease), and then I heard that she had suddenly started to improve. Previous to this time, during practically the whole period covered by these dates, she was kept alive by drenching with eggs, milk and gruel, etc., as she would not, or could not, feed on her own account. She now started to feed and when I saw her a little later, she was "putting on flesh" fast and eventually made a fair carcase of beef. Her tongue finally got moderately supple, but was full of cicatricial tissue grouped chiefly in strands. The cure was presumably due to the treatment although it was very late starting, and I have never heard of a natural recovery.

So far I have had one case of "wooden tongue" that would not respond to sodium iodide intravenously but responded to the oral administration of potassium iodide.

CATTLE "RUSTLERS" IN ENGLAND

Cattle stealing is on the increase in the Eastern Counties, and *The Times*, reporting that on March 1st Suffolk farmers opened a campaign to defeat the thieves, states: "The cattle thieves work with motor lorries late at night or in the early hours of the morning. They round up cattle in the lonely districts, pick the best, and drive them to the lorries. When the theft is discovered, the cattle are miles away. The thieves seem to be well organised, and the victims think that the police should be given special power to search cattle lorries travelling in the small hours. Farmers have also lost sheep, pigs, and poultry. In some cases the victims have become so enraged that they have armed themselves and kept watch over their stock at night.

"Mr. J. A. Peacock, of Bramfield, Suffolk, said that the cattle stealing was at its height during the summer, when the cattle were out to graze. Once the raiders had them in their lorries and were on the road, it was almost a thousand to one chance against their being caught; and there was no hope of tracing them. 'What we want to defeat the rustlers is legislation to give the police special power to stop and search cattle lorries travelling by night. At the moment they are at a disadvantage when trying to catch the thieves, who are rarely brought to book. . . . Something must be done because farmers cannot afford to be robbed like this.'"

ABSTRACTS

[The Chemotherapy of Bacterial Infections. I.—Garrod, L. P. (1938.) *Lancet.* **234.** 5986. 1125-1129, 1178-1182; II.—Whitby, L. (1938.) *Ibid.* **235.** 6011. 1095-1102.]

I.—The discovery of prontosil is credited to the staff of the Institute of Experimental Pathology and Bacteriology of the I. G. Farbenindustrie, Elberfeld. Others have contributed to its extension. Prontosil was found to be almost non-toxic, but mice inoculated with 10 minimum lethal doses of *Streptococcus pyogenes* survived if from 1-10th to 1-50th of the maximum tolerated dose were administered repeated either orally or by injection. Staphylococci were also susceptible to its action whilst pneumococci and other species of streptococci were not. The drug apparently acts best with highly virulent strains, that is, on a sparse and scattered bacterial population rather than on highly concentrated masses of bacteria. Prontosil is without action on bacteria *in vitro* and it was assumed after some investigations that prontosil was split into component parts in the animal body. Acting on this assumption work was carried out which showed that this actually happened and that one of its component parts—now known as sulphanilamide—is not only active in the animal body but also *in vitro*.

Sulphanilamide is marketed under a number of names, and in addition, there are further new compounds chemically allied to sulphanilamide making for a certain amount of confusion. The following are listed by Garrod:—

Prontosil—originally known as Streptozon—later as Prontosil rubrum, Prontosil flavum, or Prontosil. Given by the mouth only.

Soluble prontosil—Prontosil solubile, and marketed by one firm as Prontosil. Given by intramuscular injection.

Rubiazol, the French equivalent of Prontosil.

Sulphanilamide — *p*-aminobenzene sulphonamide—marketed as Sulphanilamide, Prontosil album, Sulphonamide-P, Streptocide, Prontylin, Colsulanyde, Sulphamidyl, etc. Given by the mouth, by subcutaneous injection and intrathecally.

There are three other compounds which are somewhat allied, namely, Uleron, Proseptasine and Soluseptasine.

Sulphanilamide is rapidly absorbed from the gastro-intestinal tract, absorption being complete in about four hours, and it enters the circulation at the same rate if given subcutaneously. Reaching a peak in about three hours, the concentration falls in a straight line to almost zero in 24 hours; this means that a fully adequate amount for therapeutic action persists after any single dose for about six hours; four- or six-hourly administration will, therefore, maintain this. The drug is wholly excreted in the urine but excretion is delayed when the kidneys are previously damaged.

It is pointed out that the use of a drug such as this demands a bacteriological as well as a clinical diagnosis. Sulphanilamide is a specific not for septicaemia, pneumonia or meningitis, but for infections by certain bacteria, and it interferes in some way with the activities of these bacteria in the body. It is generally accepted that sulphanilamide is active against haemolytic streptococci, but variation in its effect appears to be correlated to the serological group. For example, it is effective against Lancefield's Groups A (almost entirely a human pathogen), and C (found in man and in a variety of animals, *e.g.*, horses and cows). Its effect is variable against Groups B (the cause of most cases of bovine mastitis), E (strains from milk), and G (often associated with conditions in dogs). Against Group D there is no action. There is almost complete unanimity on the good effect of the drug in the treatment of erysipelas and favourable results have been recorded in acute tonsillitis and pharyngitis. Some authors report that under sulphanilamide treatment otitis media usually subsides without discharge, and mastoiditis without operation. Streptococcal meningitis, which was once almost invariably fatal, is amenable to treatment. Extensive and careful studies have been made of its effect on puerperal fever and there is evidence of a marked fall in the fatality rate and a shortening in the average time of illness. In diseases due to pneumococci it appears that type III infections are more amenable to treatment than others. [Since this review there are records of the successful treatment of pneumoccal infections with M. & B. 693, a somewhat similar drug.] There are few records of treatment of staphylococcal infections in spite of the fact that it was known long ago that staphylococci were moderately susceptible to prontosil. Treatment with this drug or one of its allied preparations has also been used in infections of the urinary tract due to *Bact. coli* with apparent success, whilst it is commented upon favourably in the treatment of meningococcal infections and gonococcal infections and in three cases of gas gangrene following accidents. There is no proof of its efficacy in the enteric fevers but the reports of its use in undulant fever warrant further trials. It is still doubtful if any virus disease responds to such treatment.

The toxicity of prontosil is low experimentally in animals, and that of sulphanilamide is lower, but there are numerous reports of toxic effects observed in man, most of which are not serious; there have, however, been deaths due

to agranulocytosis when the treatment had been prolonged, and their occurrence affords a strong reason for limiting treatment to a fortnight or less. The disaster is considered to be due to an idiosyncrasy, for many patients have been treated similarly and some for longer periods. Special care is necessary in debilitated subjects.

In conclusion it is noted that there are yet many deficiencies in our knowledge regarding the efficacy of this group of drugs in many diseases. Adequate therapeutic trials are necessary with some whilst in other diseases the optimum dosage and the mode of administration remain to be defined. There are in addition other compounds, some of which are now only in the process of laboratory trial, which will have to be examined therapeutically in the field, accompanied by adequate controls and bacteriological diagnosis.

R. L.

. . . . .

II.—The author begins with a résumé of the original investigations into chemotherapy and the various amino compounds found worthy of clinical trial, mentioning the tests for potency as assayed by (1) controlled animal experiments, and (2) clinical trial in human disease. It is emphasised that as all these drugs accomplish their results rapidly, prolonged treatment is unjustifiable and dangerous.

Regarding sulphanilamide, it rational use definitely demands bacteriological as well as clinical diagnosis, since it is specific only against the organism, not the pathological process. Early treatment is imperative in streptococcal and meningococcal infections and in these good results are claimed. In gonorrhoea results are less certain, 10 per cent. to 20 per cent. of cases failing to respond, and some being left with a latent residual infection. In this disease treatment is more effective after the acute stage has passed. In non-venereal genito-urinary infections, especially with *Bact. coli*, sulphanilamide gives good results, sometimes in conjunction with mandelic acid. Other conditions in which sulphanilamide has been tried and varying degrees of success claimed, include staphylococcal infections, typhoid and paratyphoid, actinomycosis, undulant fever and canine distemper.

Sulphamido-chrysoidin, the oral preparation, has now been almost entirely replaced by sulphanilamide, but in certain cases, injections of prontosil soluble are an advantage; in this case absorption and excretion are more rapid and so multiple injections are required.

Proseptasine, the less soluble benzyl compound, which is much less toxic than sulphanilamide, has been found effective clinically in streptococcal and meningococcal infections. The same remarks apply to the soluble product soluseptasine, which appears to be almost non-toxic.

Uleron is most used in Germany in the treatment of gonorrhoea, but it is doubtful if it will ever come into wide use, being more toxic than sulphanilamide and often leading to a polyneuritis.

M. & B. 693, 2(*p*-aminobenzene sulphonamido) pyridene, is of importance in that it is highly active against various pneumococci as well as being as active, if not more so, than sulphanilamide against *Strep. haemolyticus*. Trials of this drug in various other infections promise good results, though full clinical investigations have yet to be carried out. In experimental animals its toxicity is very low, and this appears to be the case in man, except for some vomiting due to gastric irritation by the drug, which is very insoluble. It is absorbed more rapidly, and excreted more slowly than sulphanilamide.

Regarding the mode of action of the amino compounds, two theories have evolved, the most widely accepted being that the drugs exert a bacteriostatic or bacteriocidal action; others consider that they have a definite detoxicating or immunising action, stimulating phagocytosis and other defensive mechanisms in the body.

Treating pneumococcal infections in mice with M. & B. 693, the author found that these drugs are *not* leucocytic stimulants. In animals cured of an experimental infection the immunity produced appears to be fundamentally the same in quantity, quality and speed of production as that created by orthodox active immunisation, and it varies with the dose of the organism, being unrelated to the dose of the drug.

An important and constant feature both *in vitro* and *in vivo* was a "lag" period during which multiplication of the organisms took place, though by 24 hours the infection was at an end. It is therefore considered that the action of the drug is not that of a protoplasmic poison, but of a hindrance to the essential food assimilation of the organism by means of a loose absorption between it and the drug.

The possible evolution of resistant strains of bacteria, as suggested by the clinical evidence of acute infections being most amenable to treatment, is confirmed by the behaviour of *S. viridans* against which M. & B. 693 appeared progressively more inactive. This gives a hint to the clinical field that in the case of incomplete recovery after one course of a drug it might be advisible to try a different one for a further course.

The author gives numerous references.

A. E. K.

[Osteofibrosis in Equines. Groenewald, J. W. (1937.) *Onderst. J. Vet. Sci.* **9.** 2. 601-620. 19 photographs. 5 radiographs.]

Osteofibrosis was produced experimentally in two-year-old fillies in order to obtain material which would serve as a standard in the study of osteodystrophic diseases of equines.

All of three horses fed on calcium-deficient diet showed symptoms of osteofibrosis and confirmatory histological examination of biopsy and *post-mortem* specimens of bone was made. [Neither these histopathological nor general *post-mortem* findings are described.] Two of the above animals received a daily ration containing 4·5 grm. CaO and 54·29 grm. P_2O_5 [CaO : P_2O_5 = 1 : 12·06]: they showed more marked symptoms than the third, which was given the same amount of CaO with 28·42 grm. P_2O_5 [CaO : P_2O_5 = 1 : 6·3]. Spectacular recovery followed the addition of adequate amounts of calcium carbonate to the diet of one of the fillies showing severe symptoms, though there was no reduction in size of facial bony enlargements. Two control fillies receiving 52·3 grm. CaO and 28·42 grm. P_2O_5 [CaO : P_2O_5 = 18·1 : 1] remained in good health.

Clinical symptoms appeared eight months after the commencement of the experiment, and when clearly established, the disease took its course in an alarmingly rapid fashion. The two horses fed on diets with the highest CaO : P_2O_5 ratio showed the following symptoms—pica (due to insufficient roughage), a shortening of stride when in action, resting on the hind feet alternately, reluctance in rising, facial swellings (due mainly to enlargement of the mandibles), pain in mastication and quidding, painful pasterns, ringbone, subcutaneous abscesses, loss of condition and weight till emaciated, and ultimately inability to rise.

The third horse developed pronounced left-sided facial enlargement, was poor in condition and had a stiff gait. The temperatures were recorded throughout and found not to be affected in any way by the progress of the disease.

The results of metabolism trials are given. All five fillies showed a positive phosphorus balance, the percentage retention being greatest in those receiving the greatest amounts of phosphorus. The author ascribes the disease to an absolute deficiency of calcium, which is accentuated by the relatively high proportion of phosphorus to calcium in the diet.

Chemical blood determinations showed no marked deviation in any particular group or constituent, so that it is concluded that blood analyses give no assistance in the diagnosis of osteofibrosis.

J. W. W.

[The Technique of Operative Fracture Treatment. Moetzen-Nielsen, H. (1938.) Thirteenth Int. Vet. Cong.]

The author confines himself to general principles. Fractures of long bones may be subjected to surgical osteosynthesis if the fracture is a clean one or in case there is only one detached fragment. In fresh cases the operation is best undertaken six to eight days after fracture, at which period the haematoma has been resorbed, but it may also be done on cases of long standing associated with imperfect alignment, excess callus or false joint.

Deep anaesthesia and perfect asepsis are absolutely necessary and the bone parts must be handled as little as possible.

Transverse fractures may be made good by Lane's splints containing for preference two pairs of screws which may be short, to penetrate the near part of the compact bone, or long enough to penetrate the near part, medulla and the opposite wall of bone too. Parham's bands are valuable for dealing with clean oblique fractures. Special tools used in these methods are illustrated.

After the bone union has been completed, the soft parts are sutured and the skin united with or without insertion of a drain tube. In certain cases it is possible for animals to run about soon after operation, using a special frame splint which removes weight from the injured limb. Bandage and sutures are removed by the tenth to fourteenth day. J. E.

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[Experiments on the Relation between the Thyroid Gland and Lactation in the Rat. Folly, S. J. (1938.) *J. Physiol.* **93.** 401-412.]

In view of the important rôle which the thyroid gland plays in general body metabolism, it might be expected that it would also exercise an important influence on lactation, which involves a comparatively heavy strain on metabolism. Published records of experimental work involving the administration of thyroid hormone to lactating animals on the one hand and thyroidectomy on the other, have given conflicting results. In the present paper the author re-examines in rats the effect of thyroidectomy on lactation. His results show that removal of the thyroids together with the small amount of associated parathyroid tissue causes a marked decline in lactation. Rats so thyroidectomised during lactation showed no obvious signs of tetany, but towards the end of a succeeding pregnancy many of them exhibited severe symptoms which disappeared on injection of parathormone. Dragsted and his co-workers report similar findings in thyro-parathyroidectomised bitches. Rats thyroidectomised during lactation and subsequently treated with thyroxine and parathormone

lactated no better than untreated thyroidectomised rats, a finding which is difficult to explain in view of the fact that throxine definitely stimulates lactation in intact animals. The results confirm previous work in emphasising the importance of the thyroids in lactation in the rat.

N. J. S.

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[Psittacosis. I.—Fortner, J.; II.—Gerlach, F. (1938.) Thirteenth Int. Vet. Cong.]

These two papers give an account of the knowledge of psittacosis attained since the severe pandemic of 1929-30, prior to which very little was known. Fortner also gives details of the method of control in Germany.

In 1930 the importation of birds of the parrot tribe into Germany was prohibited, and whereas during the epidemic there were 215 human cases of the disease in Germany, including 45 deaths, for the three years following this embargo only isolated cases occurred and it was thought that the disease had been controlled. In 1934, however, there was an alarming increase in the number of human cases (32 deaths) and investigations proved that the almost exclusive source of the virus was the popular budgerigar (*Melopsittacus undulatus*) of which there were about 15,000,000 in the country and throughout the avaries of which the disease was found to be widespread in a latent form. Restrictions were imposed on dealers and commercial breeders of susceptible birds and a rigorous stamping-out policy was employed. Infections in man continued to occur and recently these restrictions were extended to include private individuals.

Whereas other birds become unthrifty when affected with psittacosis, the budgerigar does not die from the disease and rarely shows any clinical symptoms, whilst for months the virus is disseminated and the owner placed in great danger.

The free-living budgerigars in their native home of Australia have been shown to suffer from a latent infection of the disease and the latent and clinical forms have also been found in several of the wild native birds of Germany.

It has been shown that healthy human beings may also become carriers of the virus and be capable of infecting others. In the typical disease, however, the death-rate is 20 per cent.

Clinical diagnosis in man and birds is uncertain until the presence of the virus is proved by means of a biological test in white mice. The sputum of man, and liver and spleen of suspected birds are used for the test, and inclusion bodies are readily demonstrated in the spleen and liver of the mouse in a positive case. The complement-fixation test may also be used for diagnosis.

H. H. S.

The Veterinary Record

March 11th, 1939.

Animal Charities and the Veterinary Profession

MEMBERS will have been surprised to receive a letter from the President of the Royal College of Veterinary Surgeons concerning their ethical position should they undertake work passed on to them by a technical adviser of the People's Dispensary for Sick Animals of the Poor. The matter will come before the Council of the National Veterinary Medical Association for consideration at its next meeting, on April 4th; in the meantime it is only necessary to reiterate that members of the veterinary profession will in the future, as in the past, be always willing and ready to assist in any charitable work of a veterinary nature. Though ourselves unable to advertise the fact, we do not think that the public is aware of the many thousands of cases treated gratuitously each week by veterinary surgeons.

For the moment, we must ask our members not to be unduly influenced by the unprofessional announcements that have been appearing in the daily Press confirming the arrangement between the R.C.V.S. and the P.D.S.A. It is hoped that the "National" will be able to consider in an unbiased atmosphere the possibility of developing this arrangement in practice, in the hope of extending, whenever possible, the exercise of the previous willingness to help the animals of the poor.

Members already know that the scheme between the National Veterinary Medical Association and the Royal Society for the Prevention of Cruelty to Animals, which was initiated in 1932, has been under consideration for some months, and that an amended scheme to avoid certain difficulties which have arisen in practice is virtually completed. It will now be the duty of the "National" to examine the proposals of the P.D.S.A. and to draw up a scheme the conditions of which would be acceptable to our members.

The First Imperial Veterinary Conference

THE Report of the First Imperial Veterinary Conference* held at the Royal Veterinary College, London, on August 15th to 18th, 1938, is a document which we commend for study by veterinarians whose aim it is to embrace all the facilities that are now within their reach for their professional progress. It is likely to become, we feel assured, a document of first-rate importance to the future veterinary historian.

Read in conjunction with the Ninth Annual Report of the Executive Council of the Imperial Agricultural Bureaux,1937-38,† which has also just come to hand, it is at once evident that an earnest endeavour has been made within the last few years to surmount the woeful handicap to the progress of veterinary science arising from the lack of an easily accessible and reliable stock-taking of the recorded experiences in this highly diversified and rapidly expanding composite science. Veterinary research workers recruited at the present day scarcely realise the wellnigh impossibility experienced by their colleagues a generation older in tracing the existing references to previously recorded work upon their special subjects of investigation. Some help could be derived from certain admirable German and French periodical surveys, but nevertheless the information contained in them was often incomplete and frequently out of date. This has now been remedied on the scientific side of our work at any rate, since the establishment, in 1929, of the Imperial Bureau of Animal Health at the Ministry of Agriculture's Veterinary Laboratory, New Haw, Weybridge. Its publications, the *Veterinary Bulletin* and *Index Veterinarius* are now the indispensable literature of veterinary research workers. The many other forms of help which workers have received from the Bureau would compel them to recognise that with the advent of the enterprise there has come about one of the most stimulating, well-organised and vigorous aids to veterinary progress within recent times.

To trace the origin of this enterprise, we need to recall the series of events briefly summarised in the preface to the Report of the Imperial Agricultural Bureaux we have mentioned above. The Imperial Agricultural Research Conference, 1927, it says, "stressed (*a*) the need for scientists to be in touch with the progress throughout the world in their several branches, and (*b*) the difficulty therein owing to the great output of scientific literature and the diversity of languages in which it is published." The Governments of the British Commonwealth were recommended to establish on a joint co-operative basis eight bureaux—one of which was to be the Imperial Bureau of Animal Health—to collect, collate, and disseminate information on research on eight selected branches of agricultural science and generally to assist research workers in the Empire with information relevant to their subjects. Each bureau was to be located at a research institute specialising in its own branch of science so that the bureau officers should be in daily contact with men engaged in research in its own subject. Governments accepted the proposals, and one of the general principles to be observed in regard to the working of the Bureaux was "careful and periodical examination of the work and organisation of the Agency at Empire conferences suitable for the purpose, as without that assurance governments could hardly be expected to provide the adequate continuing finance."

The meeting of the International Veterinary Congress at Zurich in 1938 represented a suitable opportunity for assembling an Imperial Veterinary Conference at which the work of the Imperial Bureau of Animal Health could be considered and problems of common scientific interest discussed. A short notice of the work of the Conference appeared in this journal shortly after its sittings. Briefly, the problems of scientific interest chosen for discussion by the official delegates and others invited to attend the Congress were: foot-and-mouth disease, caseous lymphadenitis of sheep, virus diseases of animals—general discussion, laryngotracheitis, infectious bronchitis and coryza of poultry, blowflies of sheep, fowl paralysis, bovine mastitis, Johne's disease, and chronic bovine haematuria. The symposia on these subjects presented in the report of the conference disclose an interesting display and exchange of views by workers situated in different parts of the world, though for the most part they are a recapitulation of well-known

*Report of First Imperial Veterinary Conference, August 15th to 18th, 1938. Weybridge: Imperial Bureau of Animal Health, Weybridge, Surrey, England. Price 5s. 6d.

†Imperial Agricultural Bureau, Ninth Annual Report of the Executive Council, 1937-38. London: H.M. Stationery Office (Price 2s. 6d. net).

information in the specialised literature. In some of the discussion one cannot help noticing the salutary effect upon isolated workers of the helpful and unaccustomed criticism received, and one is forced to recognise the immense advantages derived by research workers at home from the frank and informal discussions of research clubs. Again, in some places, one notices not infrequently that the "official" delegates of Governments to conferences appear to lack first-hand experience in research work. More extended summaries of these discussions will appear later in our abstracts columns.

Necessarily transcending the above discussions in essential importance, however, is the Deputy-Director's illuminating account of the work of his Bureau, and the constructive proposals for extending its scope and usefulness which emanated from the dicussion which followed and from the findings of the representative committee which was appointed to consider the work of the bureau. "Veterinary literature," Mr. Pool says, "defies definition. It is a subject which always has been and still is notoriously difficult to cover." After exemplifying the immense difficulty in tracing for purposes of abstracting all information of veterinary importance in the widely scattered literature, Mr. Pool utters a paragraph which we believe to be well worthy of editorial reproduction, for its relevancy to all workers, clinical as well as non-clinical, in the veterinary domain:—

> "But a bureau—certainly a specialised bureau—should, in my opinion, go further. By its contacts with research workers, by the information it has or should have of work in progress, it should be a safeguard against the loss of information about work done but not elaborated. Much outstanding work is undertaken as a matter of routine by efficient workers who perhaps do not realise that it is of sufficient moment to appear in print for others to read about. We all know that sheep scab was eradicated from Australia towards the end of the last century. Yet the manner in which the result was achieved was never made clear."

The sentiment contained in this passage is strongly reminiscent of that in an early editorial article written in this journal by the late William Hunting, wherein he urged the reporting of the usual rather than the rare phenomena of current veterinary practice, giving as his example, to show how major events may pass entirely unrecorded, the fact that venesection as a common veterinary intervention became entirely abandoned without a trace left in our literature as to the time and circumstances of its falling into desuetude.

Practised observers cannot but have an uneasy feeling that for many reasons this kind of lapse is an exceptionally common phenomenon in veterinary matters. Much of the work done in laboratories is without doubt greatly overwritten, and great care needs to be exercised in giving further publicity only to publications that will stand the closest criticism. Some of the most striking observations are, on the other hand, it is well known, recorded in a few words in the Annual Reports of overseas veterinary departments, while most of the tried methods and experiences of clinicians go altogether unrecorded. The ideal of personal contact with prime observers is therefore, we feel sure, one that is to be encouraged by every possible means. Much is to be gained, without doubt, by the location of the Bureau, as was originally laid down, within an atmosphere of research, but those who stand in need of personal consultation with the Bureau staff would feel generally that its transfer to London, where possibly its resources would be amalgamated with those of the Central Library for Animal Diseases of the R.C.V.S. would be a very distinct advantage.

An appendix to the Report shows that references were taken from 539 journals in all for the *Index Veterinarius* in 1935. It is satisfying to note among the eight periodicals which provided the largest number of references (150 and over) there occurs the name of the *Veterinary Record*. If any observation is called for from the presentation of this long list of periodicals it would be that we would like to see greater attention given to journals with an agricultural or animal husbandry interest. But doubtless it could be well argued that these are already well covered by the publications of the other bureaux. Some of the figures given for the total number of references to titles of papers annually dealing with some diseases are stupendous. For example, tuberculosis has between 500 and 1,000 references, bovine contagious abortion between 250 and 500, and bovine mastitis and foot-and-mouth disease between 100 and 250 each. One may well ask what this great mass of published material really amounts to, seeing that the annual tangible evidence of change in outlook regarding some of these diseases is so small as to be almost negligible. Our most eminent historian upon bacteriology has even expressed the view that for several years after the publication of

Koch's original classical monograph upon tuberculosis very little appeared in the massive literature upon this subject except the filling of trivial lacunae in our knowledge. It is evident, however, that an indispensable aid to the investigator has been provided by both the *Veterinary Bulletin*, which first appeared as an abstracting veterinary journal in 1931, and the *Index Veterinarius* which first appeared in 1933. No measure of the value of these periodicals can be obtained from their circulation, which has remained a relatively small one, and upon this point some anxiety was expressed. Yet the issues of these periodicals remain trustworthy guides to those in quest of the sources of original information, and they, though their labours benefit eventually the whole profession, will always remain small in point of numbers. For this reason, without generous help from Governments, these laborious enterprises could not be undertaken. It is disconcerting to note under what conditions of parsimony some of the bureaux comprised within the Imperial Agricultural Bureaux have to operate.

With all the above considerations in mind, the First Imperial Veterinary Conference placed on record its view insisting on the extreme importance of the Bureau of Animal Health to all those engaged in veterinary research in the British Commonwealth of Nations and recommending its further development on the present lines. Many of the abstracts appearing in the *Veterinary Bulletin* might, in its view, with advantage be longer, especially scientific ones likely to be of interest to field officers, and those summarising papers and articles in the more difficult foreign languages. More attention, it was felt, might be given to the subject of nutrition, especially to nutrition as related to disease. The value of critical, succinct reviews from six to twelve pages in length on particular diseases was stressed, these reviews to be undertaken by selected writers fully competent to review the particular subject. It may be taken for granted that all the recommendations by the Conference for the proper expansion of the activities of the Bureau and the consequent increase in its staffing will receive the hearty support of this journal and the bulk of the veterinary profession which the Association now represents.

Five prize Ayrshire cows valued at £50 each were found dead on a dairy farm near Driffield recently. It was ascertained that the cows had strayed into a wood and had been eating the leaves of yew trees.

REVIEWS

[**Animal Pathology.** By Russell A. Runnells. Collegiate Press Inc., Ames, Iowa. Price $6.]

In reviewing a text-book it is clear that the purpose for which the book was written must be kept in mind: this book is intended primarily as a text for students of American veterinary colleges in the second year of the professional curriculum. The various pre-clinical subjects have been given practical meaning in relation to animal disease and the text might be said to constitute a brief introduction to clinical medicine.

The first part of the book, 184 pages, deals with general pathology, illustrated with references to disease in animals. On the whole, the author has succeeded in presenting an interesting account of the processes of general pathology although it is doubtful whether the student will gain from it information more valuable than from a study of the respective section of one of the several excellent English or American text-books of human pathology. The student would do well to view critically many of the statements made rather than accept them as incontrovertible facts. Occasionally, one encounters a passage which, to say the least, is difficult to understand, *e.g.*, "Endogenous poisons originate from . . ., and in extensive *ante-mortem* clot formation (thrombosis) in the intestines . . ." (p. 20), or, again, describing hyaline degeneration, "Microscopically, it appears smooth like butter or lard . . ." (p. 71). The magnification of the lower illustrations of Figs. 16 and 32 is clearly incorrect. The account of *post-mortem* changes in animals is brief but excellent, as is the chapter of 30 pages dealing with neoplasms. On page 156 it is stated that *Gongylonema neoplasticum* is a cause of gastric carcinoma in dogs—presumably this should read "in rats."

Parts 2 and 3 comprise the author's former book on Special Pathology, entirely revised and considerably extended.

Part 2, consisting of 165 pages, deals with systematic pathology: there are no sections dealing with the locomotor system or with the ductless glands but references to these are given under general pathology. It is surprising to find on page 146 that ostitis fibrosa (oesteodystrophia fibrosa) is regarded as synonymous with osteomalacia. Among the causes of metritis in the cow there is no mention of the tubercle bacillus.

The remaining 100 pages of the text are devoted to a description of the most important specific infectious diseases. The account of tuberculosis is very brief and disappointing and it takes no account of modern work on the pathological anatomy of the disease in animals.

There is an excellent account of the lesions of swine fever which should help to lay the bogey of the supposed importance of "button ulcers" in the minds of students—and others.

The great majority of the illustrations have been taken from the *Journal of the American Veterinary Medical Association* and are for the most part excellent. It is surely important, however, in a book intended for students, that magnifications should in every case be clearly indicated—this is not always the case.

The book does not attempt to deal with bacteriology or with animal parasitology, and some of the bacteriological designations may be puzzling to English students.

At the end of each chapter there is a short list of references, usually to American journals. These references are extremely useful.

It may come as a surprise to English readers to learn that six trillion erythrocytes are destroyed daily in the horse. A trillion in America is, however, a million millions and a billion is only a thousand millions in contrast to the meaning which these terms have acquired in English.

This book should be of considerable value to the student or practitioner who is prepared to read it critically and in conjunction with information derived from other sources. It should prove a useful addition to the text-books of veterinary pathology.

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[Hunting, Showing, and 'Chasing, with chapters on hunter trials and breaking and making a hunter colt. By Sam Marsh. (Jarrolds.) Price 10s. 6d.]

We have quoted the title in full above, for it gives in précis the aims of this volume, and we can say unreservedly that its author has most ably achieved his object.

Mr. Sam Marsh is widely known as a past-master in all that appertains to horsemanship and horsemastership. He also as an author reveals a very pretty and apposite wit. To the reviewer, to whom much of his teaching must come in the nature of "shop," this light and humorous touch makes the task of reviewing a real pleasure. As we have nothing but praise for this book and recommend it unreservedly to our readers we refrain from quotations, and hope they will purchase it for themselves to enjoy the excellent yarns it embodies. Suffice it to say that for once the inevitable chapter on first aid and ailments is a model of what it should be in a work of this nature. It recognises the limitations of first aid, and states exactly where the horse owner must expect to enlist professional aid, and cease to hope for cure without such aid.

The book is excellently got up, the illustrations are numerous and helpful, and we wish it a long and useful career.

N.V.M.A BRANCH REPORT

Scottish Branch*

MEETING AT GLASGOW

A General Meeting of the Scottish Branch was held in the North British Station Hotel, Glasgow, on the afternoon of Saturday, January 28th, 1939.

The President (Major J. G. McGregor) occupied the Chair and the following signed the attendance book: Messrs. J. Andrew, S. G. Abbott, D. Brown, J. Cameron, D. Campbell, J. B. Currie, H. F. Downie, Professor H. Dryerre, Mr. A. L. Ford, Mr. H. Gillmor, Professor T. Grahame, Messrs. A. Gibson, H. H. Holman, S. Jamieson, Professor R. G. Linton, Messrs. J. B. McDougall, E. M. Mackay, J. McQuaker, John Macfarlane, A. M. K. McLeod, P. W. McIntyre, R. E. McGrath, Professor W. M. Mitchell, Messrs. M. H. W. Miller, W. Nairn, S. Pottie, D. S. Rabagliati, J. N. Ritchie, A. Robertson, W. Robson, Professor W. Robb, Mr. A. Sillars, Dr. J. Stewart, Messrs. R. M. Smith, J. G. O'Sullivan, J. F. Taylor, A. Thomson, C. Tracy, W. Watt, H. M. Wilson, W. L. Weipers, Professor G. Weir and Mr. A. Young, and the Hon. Secretary (G. F. Boddie). Colonel Sir Arthur Olver and Dr. W. R. Wooldridge were also present.

The minutes of the last General Meeting, as published in the *Veterinary Record*, were taken as read and approved on the motion of Mr. D. Campbell, seconded by Mr. W. Robson.

The Hon. Secretary read the obituary list, the members of the Branch standing: Dr. O. C. Bradley, Edinburgh; Mr. B. Philp, Cupar-Fife; Mr. Adam Gibb, Dumfries; Mr. W. Scott, Penrith; Mr. J. Brown, Perth; Mr. J. Beattie, Langside; Mr. A. Wooley, Kirriemuir; Mr. R. E. Drennan, Aberdeen; Mr. J. Ker, Peebles, and Mr. J. R. Somerville, Clarkston.

The Hon. Secretary intimated the receipt of apologies from Major Spreull, Dr. Whitehouse, Mr. Sangster, Major Baird, Major Brennan DeVine (President, N.V.M.A.), Dr. J. R. Greig, Mr. W. W. Peggie and Mr. W. M. Henderson.

The President then extended a welcome to Colonel Sir Arthur Olver, Principal of the Royal (Dick) Veterinary College, and to Dr. W. R. Wooldridge, Hon. Secretary of the N.V.M.A.

Correspondence

The President called on the Hon. Secretary to read any correspondence and explain the action taken arising therefrom.

*Received for publication February 3rd, 1939.

(1) Acknowledging result of the collection taken for the Victoria Veterinary Benevolent Fund at the last meeting.

(2) The appointment of Mr. W. Nairn as representative of the Scottish Branch on the Scottish Board of Research in Veterinary Science for a further period of three years.

(3) Adrian Jones Statue Appeal Fund. The Council recommend that no action be taken.

(4) Royal Sanitary Institute Congress, 1939. The Council recommended the appointment of Mr. S. A. Abbott, as the representative of the Branch. On the motion of Mr. D. CAMPBELL, seconded by Professor ROBB, this was confirmed.

(5) Intimating that the response to enquiries made by the "National" of the Breed Societies to see if they would support the restriction of the sale of tuberculin had proved unsatisfactory.

Arising out of this, Mr. A. THOMSON raised the matter of the potency of the tuberculin at present being supplied to the profession.

The PRESIDENT called on Dr. Wooldridge to explain what had been done by the "National" in this matter.

Dr. WOOLDRIDGE, in reply, said he first wished to thank the members of the Branch for the warmth of their welcome. The "National" had formed a committee charged with the task of enquiring into the various tuberculin tests and the potency of tuberculin. This committee was pursuing its work actively and it was essential to their success that details of apparent discrepancies in tuberculin testing should be sent to the committee. All such information would be treated in confidence.

Branch Representation Fund.—The PRESIDENT reported that since the last meeting, he had collected the sum of £11 10s. for the Branch Representation Fund and he sought authority to pay that sum over to their representative, Mr. Nairn.

This year, Sir Arthur Olver would, he expected, be standing for the Council and it seemed unwise to put forward any other candidate from Scotland, but another year they might do so.

Mr. WATT proposed and Mr. D. CAMPBELL seconded that the money in the Branch Representation Fund be paid over to Mr. Nairn.

Mr. NAIRN thanked the members of the Branch for their useful help. The number of meetings of the R.C.V.S. had increased so much as to make the cost of travelling very considerable. The R.C.V.S. Council had turned down the payment of travelling expenses of its members without giving any very good reason, as they had the funds and could not say that they could not afford it. He would welcome the election of Sir Arthur Olver to the Council of he R.C.V.S.

The PRESIDENT said he thought it fitting that the Branch should record its thanks to Mr. Nairn for his services, and this was cordially agreed.

It was decided that the Divisional Secretaries should continue to make the collection for the Branch Representation Fund, and the Hon. Secretary was instructed to communicate with the Divisional Secretaries in the matter.

The Presidential Address

The PRESIDENT (Major J. G. McGregor) then delivered the following Presidential Address, which was accorded an enthusiastic reception :

Custom has decreed that at the Annual General Meeting of the Scottish Branch the President addresses the members on any subject he may choose, and having unburdened his mind, he is relieved of any anxiety which his words may have caused by the further concession that his views are not open for discussion by the members.

Under these circumstances, I have no desire to raise any controversial subject but propose to confine myself to a review of the period which has passed since our last meeting.

In many respects, 1938 was a memorable year for the veterinary profession and by your leave, I shall endeavour to sketch the outstanding events and their repercussions on us as a Branch.

In the first place, we had a member of the Branch as President of our Association, and we are proud of the manner in which he represented us.

You may remember that at our last meeting we asked our Hon. Secretary to convey to Dr. Bradley our wishes for his recovery from the sudden illness which had befallen him. We did not think of a fatal termination to it and his death came as a great shock to us all. The veterinary profession has been fortunate throughout its history in producing from its ranks a succession of men who in turn rose and directed the general body of the profession in the way it should go—men with vision, lofty ideals and the courage of their convictions. Amongst those the name of Orlando Charnock Bradley will be found. In great measure, he stamped his personality on all the students who sat under him and his name will always be associated with the College he served so faithfully.

We do well in this Branch to honour his name for he was, if not the sole, the chief architect of its foundation and that we have been able to function throughout the years was in great measure due to the help which he gave so ungrudgingly. We are all, I fear, apt to forget the great work for the profession which Dr. Bradley, Mr. Arthur Gofton and others did when they welded the scattered veterinary societies

throughout the land into the body corporate of which we form a limb.

The history of our profession is not appreciated as it should be, but one is glad to note signs that it is not being neglected altogether.

In another connection to-day, mention may be made of the "inferiority complex" which some witnesses before the Veterinary Education Committee represented the veterinary student of to-day to be suffering from. I know of no better cure for such a condition than a study of the history of the veterinary profession. The historical review which Dr. Edwards wrote for the Jubilee number of the *Record* would form a suitable introduction to the subject; in fact, I think some knowledge of our history should be obligatory on our students before graduation.

A very important page in our history has been written during the past year and one wonders how it will appear to our successors.

April 1st, 1938, will long remain a memorable date in the annals of our profession, for on that date, the State Veterinary Service was inaugurated. There have been few events in our history which have influenced the lives of so many of our members as this has done.

In all the comments which its advent has called forth I have seen little reference to the part which this Branch has played in bringing it to pass. It is just ten years ago since this Branch sponsored the Scheme for the Eradication of Bovine Tuberculosis and stirred up the profession to consider its responsibilities in the matter. There can be no doubt that the campaign, which later was entered upon with enthusiasm by all members of our Association, did much to educate public opinion in the question so that when in May, 1937, the first public announcement was made by the Minister of Agriculture, he found that the principles underlying his plan were warmly welcomed both by the agricultural community and the public at large. You will not expect me and I do not propose to say much on this subject. The success which has attended the Service since its inauguration reflects great credit on those who drew it up in the first instance, on the leaders of our Association who helped by their criticisms to mould it into its final shape and on the great body of the profession who are to-day loyally carrying out its provisions.

The next event which calls for comment by me was the visit of the American Delegation to Scotland in August. Under the leadership of Dr. D. M. Campbell, Chicago, this party visited both Glasgow and Edinburgh Colleges. At Edinburgh, the Branch entertained the Delegation to lunch and were greatly interested to listen to a very fine address by Dr. Campbell, in which he paid tribute to the Scottish Colleges for the men they trained and sent forth to found, largely, Veterinary Education in North America. Opportunities of this kind of meeting our confreres from other countries do not often occur and the experience was a very happy one for those who were able to attend the function.

In September, the Congress of the N.V.M.A. was held in this city and we all know the great success it proved to be. As a Branch, we entertained the profession prior to the opening of the Congress, and I wish to take this opportunity of thanking the various Divisions for the generous support which they gave to the Branch on that occasion.

To complete the chronicle of this memorable year, there still remains one event to record which may prove to be fateful for our profession. I refer to the report of the Veterinary Education Committee. What will come out of this report will depend greatly on the reception which it receives from the profession and while there may be some points in it with which we do not agree, surely it is our duty to sink our individual objections and endeavour to secure the best terms for the generation which is succeeding us.

In conclusion, may I take this opportunity of thanking you very sincerely for the honour you conferred on me when you elected me as your President and of expressing my gratitude to the Executive Committee and Honorary Secretary for all the help they gave me throughout the year.

Hon. Secretary's Report

The Hon. Secretary (Professor G. F. Boddie) then gave his report of the activities of the Branch, reported on the state of the Branch Funds at December 31st, 1938, and gave a report of the accounts of the lunch given to the American Party.

During the period that has passed since my last report of the activities of the Scottish Branch there been one general meeting.

Owing to the negotiations that have been going on during the past year as a result of the change-over resulting from the Agriculture Act of 1937, an open meeting of the Branch concerning these matters was rendered unnecessary as they were being dealt with by the Consultative Committee of the "National." This Committee has undertaken work of a type hitherto performed by the Scottish Branch. Though a comparatively small committee, the Scottish Branch has been adequately represented in Mr. D. Campbell, Major J. G. McGregor and Mr. S. G. Abbott. The Branch cannot be other than grateful to these gentlemen for their services during this critical period.

The appeal on behalf of the Victoria Veterinary Benevolent Fund again met with a gratifying response which it is hoped will be maintained at this meeting.

As your representative I served on the Provisional Committee of the 1938 Congress. Unfortunately, I was unable personally to attend the Congress.

As your representative I am a member of the Appointments and Veterinary Officers and Public Health Committees of the "National." I have attended the meetings of these Committees and of the Council of the N.V.M.A. whenever possible. This vital link between the Branch and the "National" headquarters is of great importance. In this connection I should like to endorse all that has already been said in gratitude for the great services given to the profession during a very critical period by Mr. D. Campbell. It is a matter of great pride to the members of the profession in Scotland that the affairs of the "National" should have been guided in such a statesmanly manner during the transition to a general State Veterinary Service.

Early in August last the Scottish Branch gave a luncheon to a party of Americans passing through Edinburgh. Accommodation for this lunch was provided by the Royal (Dick) Veterinary College, and the party were subsequently entertained to tea at the Animal Diseases Research Association. The lunch was very successful from every point of view. Its financial success was due not only to the support given by those present, but it was also the fact that a considerable number of the members of the Branch who could not attend sent contributions towards the expenses. The "National" gave the Branch a contribution of £5 towards the expenses, but when I came to make up the accounts I found there was a balance of £5 6s. 1d. Your Executive Committee decided that the sum of £5 should be returned to the "National" and the balance of 6s. 1d. paid into the general Branch fund.

I have been appointed a member of the Air Raid Precautions Committee of the "National," which was formed to consider the protection of animals in warfare. This Committee has been joined with that appointed to consider the organisation of the veterinary profession in time of war. The work of this Committee promises to be extremely interesting and is no doubt of considerable national importance. The combined Committee is now named the "National" Emergency Committee. The Home Office have co-opted to their committee on the protection of animals the members of the N.V.M.A. Air Raid Precautions Committee; this valuable step ensures official status for the activities of the "National" in this matter.

The PRESIDENT said the Branch must be indebted to the Hon. Secretary for his account of the activities of the Branch.

Mr. J. N. RITCHIE proposed and Mr. J. CAMERON seconded that the report and accounts be received and adopted.

Professor LINTON proposed a very hearty vote of thanks to the Hon. Secretary for his work in connection with the Branch. They well knew that the success of the Branch was largely dependent on the Secretary.

Election of Office-bearers

President.—The retiring PRESIDENT (Major J. G. McGregor) intimated that this year it was the privilege of the West of Scotland Division to nominate the President of the Branch and their nomination was Mr. A. Thomson. He had much pleasure in proposing the election of Mr. A. Thomson as his successor. Mr. D. CAMPBELL seconded. The election was carried unanimously and Major J. C. McGregor surrendered the Chair to Mr. Thomson.

Mr. NAIRN congratulated Mr. Thomson on his election and wished him a very successful year in office.

He proposed a very cordial vote of thanks to the retiring President for his services during his term of office.

Hon. Secretary.—The PRESIDENT (Mr. A. Thomson) proposed the re-election of Professor Boddie. Mr. WATT seconded. The election was agreed to.

Elected Representatives (six).—Professor Weir and Mr. Abbott proposed Mr. D. Campbell; Mr. Ritchie and Mr. Robertson proposed Professor W. M. Mitchell; Major McGregor and Mr. W. Robson proposed Mr. W. Watt; Mr. D. Brown and Mr. J. Cameron proposed Mr. A. Young; Mr. D. Campbell and Mr. A. Young proposed Mr. J. F. Taylor; the Hon. Secretary and Mr. H. Gillmor proposed Mr. A. Gibson.

The only other nominee having withdrawn his name, the PRESIDENT declared Mr. D. Campbell, Professor Mitchell, Mr. W. Watt and Mr. A. Young, Mr. J. F. Taylor and Mr. A. Gibson elected Representatives to the Branch Council.

Discussion on the Veterinary Education Committee's Report

The PRESIDENT called upon Colonel Sir Arthur Olver to open the discussion.

Sir ARTHUR OLVER, before proceeding to the subject for discussion, expressed his thanks for the kind reception he had received on all sides since he came to Scotland. He was grateful to the Branch for their reception and for their promise of support at the forthcoming R.C.V.S. elections.

His ideal was to do what he possibly could for the veterinary profession. In following Dr. Bradley, he realised he had a very difficult task. It would not be possible for him to carry on without the support of the staff of the College and the veterinary profession as a whole in Scotland.

Continuing, Colonel OLVER said it was not possible in the time at his disposal, to cover the whole ground. All he could do would be to give them some general conclusions which he had formed in regard to the development of Veterinary Science and Veterinary Education from a careful study of the report and his 40 years of experience of veterinary work in a variety of army and civil appointments.

But before doing so, he thought it necessary to draw attention to the terms of reference since some of the recommendations seemed to go considerably beyond them. For example, the recommendation that members of certain universities should be included on the Council of the R.C.V.S. would have to be dealt with on much wider issues than veterinary education alone, and would, he felt sure, not be generally acceptable to the profession. He was glad, however, that there had been no suggestion that the one-portal system should be abolished and felt that in any case the profession should gratefully recognise the appointment of this committee as a welcome attempt on the part of Government to do something for veterinary education.

Though he could not accept all the views and recommendations of the committee, he felt sure that the attention which the report had drawn to the starved condition of veterinary schools would be productive of much good. In his view, the greatest need of veterinary education in this country to-day is to obtain funds to equip more adequately and staff existing colleges, where up-to-date teaching and research on the subjects taught could be satisfactorily carried on. If funds were made available the colleges would themselves be able to devise a sound scheme for veterinary training which would not involve drastic modification of the present system. But to draw up a satisfactory curriculum was a most complex affair which could be done only by those who knew the circumstances under which it would have to be worked.

He fully appreciated the advantages of university contact for veterinary students, particularly in social and intellectual life, but these advantages could, to a large extent, be obtained by students of veterinary schools affiliated to universities and without further information, he could not accept the suggestion which had been made to secure closer organic connection with universities by instituting a three-year B.Sc. degree, which would exempt from a similar period at a veterinary college in the M.R.C.V.S. course. How this proposal was to be carried out was not quite clear, but unless the bulk of the training was to be given at veterinary colleges, he did not believe it would be possible to train veterinarians satisfactorily within five years under such a scheme, and he understood that it was very doubtful if the Scottish Universities would be willing to grant a degree for a course of training carried out in this way. He felt that the present B.Sc. university degree course which is now carried on, for example, by Edinburgh University, along with the M.R.C.V.S. course and mainly at the Royal (Dick) Veterinary College, could be made a much sounder veterinary education; moreover, as the professors in the non-clinical subjects were recognised university teachers and examiners in those subjects, it could hardly be said that the students and teachers are "isolated," while in the case of those who take the B.Sc. there is no barrier against taking higher degrees.

Thus, unless we could be sure that veterinary colleges would be adequately staffed and equipped and sufficiently endowed for research on the veterinary aspects of the subjects taught, he felt that it would be a mistake to drop the substance of the present system of veterinary education for the shadow of university status.

He agreed with the view recently expressed by M. Leclainche at Zürich, that the social standing of the profession would coincide with the rigour of the conditions imposed for the admission of students, but his experience in South Africa, the U.S.A., the Sudan and India, and in this country, had convinced him that the power and influence of the profession would depend more on the level of its scientific development and on the economic value of the service it gives than on close and continuous association with students who have other aims and interests. To illustrate this point he mentioned the great power and influence which had been secured by the Veterinary Department of South Africa and the great Bureau of Animal Industry of the U.S.A., due to the great economic benefits which had resulted from properly directed application of veterinary knowledge to the control and eradication of disease, by scientific methods. The Veterinary Department of the Ministry of Agriculture had been no less successful in keeping this country free of the more fatal plagues of livestock, but the stamping out method which had—quite rightly—been adopted had no appeal to the public, and he felt that it was largely due to this fact that the great economic value of their work had not received more adequate recognition than it had. Indeed, one commonly heard the veterinary profession severely criticised for adopting this method for the control of foot-and-mouth disease and condemned as non-progressive because it had not developed a more scientific means of control. But in recent years, world competition had caused closer attention to be paid to disease as a most important factor in the success or failure of livestock production and it was clear that Government were now prepared to spend

money for the development of veterinary science. This was an important advance and he felt that every effort should be made to seize the opportunity to place veterinary education on a better footing, provided that it would be conducted along sound lines.

He agreed with M. Leclainche that, in view of the necessity to limit the period of study for an ordinary veterinary qualification and of the very wide range which has to be covered in the time, we must accept the view that though our work must have a scientific aspect, it is essentially utilitarian. He felt, therefore, that our courses of veterinary training would have to assume a predominantly vocational bias at an early stage, and that it would not be possible to train a veterinarian satisfactorily unless at least four years of the course were spent at a veterinary college, where the veterinary aspect of our work could be adequately dealt with.

He was sure that our aim should be to build up well equipped and well staffed schools of veterinary science which, working in close co-operation with universities, would give thoroughly practical courses of veterinary training and carry on fundamental research on the subjects taught, thus making a definite contribution to our knowledge. It would be admitted that though a great deal of research had been done in recent years, particularly in regard to specific disease problems, an immense field for research was still open in Veterinary Pathology and Bacteriology and still more so in the veterinary aspects of Anatomy and Physiology and Hygiene, which had hardly been touched. He believed that only by veterinary research, carried on continuously at veterinary schools, could the teaching of veterinarians be kept alive and progressive and a proper spirit of inquiry developed in their students.

He had always been in favour of the more elementary training in the basic sciences, such as Chemistry and Physics, being given in the appropriate faculties of the universities, but he believed that the veterinary aspects of these subjects and of such subjects as Anatomy, Physiology and Hygiene were not likely to be adequately dealt with except at veterinary schools.

The financial aspect of this proposal to institute a three-year B.Sc. course in Science, to exempt from a corresponding period in an M.R.C.V.S. course, was, moreover, one which would require to be very carefully considered. Unless special arrangements could be made there was great danger that the colleges would lose the fees for the first three years and, unless much more heavily endowed than at present, by Government or from some other source, they would not be able to give proper courses of training in the clinical subjects.

He felt that to enable the profession to take its proper place, veterinary students would require to be thoroughly instructed in all aspects of animal husbandry and in the development of animal industry as well as in the treatment of disease.

He agreed that the scheme proposed for a seven- or eight-year course of special training, partly at Cambridge and partly at a veterinary college, though somewhat disjointed, would be suitable for students who had made up their minds to adopt veterinary research as a career. They would not require such a thorough training in the practical aspects of animal husbandry and the treatment of disease, but would have the benefit of prolonged association with research and research methods.

To sum up: he felt that to attain full stature, the veterinary profession would have to work out its own salvation in its own, properly equipped and adequately staffed training institutions, at which veterinarians could be trained in the veterinary aspect of all and every part of our professional work.

He believed that early in their training, and at their own colleges, veterinary students ought to be brought into the closest practicable association with farm animals and with research upon the subjects taught and he believed that a proper introduction to research methods was of great importance. He agreed that lack of the research atmosphere had been a great defect of veterinary education in this country, largely due to penury, and felt that it was more important to overcome this than to seek an association with other students in university classes where the professors could not possibly devote much attention to the veterinary aspect of the subjects taught.

In the subsequent discussion, the following gentlemen spoke: Professor Robb, Mr. D. Campbell, Mr. D. Nairn, Dr. Holman, Professor Linton, Professor Dryerre and Dr. W. R. Wooldridge.

Sir Arthur Olver replied to the discussion.

Major J. G. McGregor proposed the following resolution: "While there may be some points on which this Branch may differ from the findings of the Committee on Veterinary Education, this Branch nevertheless is of the opinion that the report offers considerable possibilities for the future of veterinary education and, therefore, wishes to record its general approval of the report and to register that it is in full accord with the resolution passed by the Council of the N.V.M.A. at its meeting on January 3rd, 1939."

Mr. D. Campbell seconded the adoption of this resolution which was carried by a majority.

The Hon. Secretary was instructed to forward the resolution to the General Secretary of the N.V.M.A., and also to send a copy to the Secretary of the R.C.V.S.

The PRESIDENT proposed a vote of thanks to Sir Arthur Olver and Dr. Wooldridge for their contributions to the discussion.

On the call of Professor MITCHELL, a similar tribute was paid to the Chairman and, there being no other business, the meeting terminated.

GEO. F. BODDIE, *Hon. Secretary*

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N.V.M.A. DIVISIONAL REPORTS

Southern Counties Veterinary Society*

MEETING AT SOUTHAMPTON

MR. E. L. TAYLOR'S ADDRESS ON THE DIAGNOSIS OF HELMINTHIC DISEASE

A meeting of the Society was held at the South-Western Hotel, Southampton, on Friday, December 16th, 1938.

The President, Mr. F. Beckett, was in the Chair, and the following members attended: Messrs. N. S. Barron, H. S. Caldwell, G. N. Gould, W. F. Maynard, H. C. Rockett, J. F. D. Tutt, J. B. White, Majors C. Davenport, J. Facer and J. S. Wood. Miss C. M. Scutt, Dr. A. C. Fraser, Messrs. Esmond Brown, E. L. Taylor, E. Noel and J. B. Tutt, Jun., were present as visitors.

The reading of the minutes of the last meeting was postponed until next meeting.

Apologies for inability to attend were received from Major Wallace and Mr. J. D. McLauchlan.

The Secretary read a letter from the N.V.M.A. regarding the article prepared by the Advisory Committee on Poultry Disease. It was proposed to postpone consideration of this to a future meeting.

A second letter brought to the notice of the Society the resolution of the Society of Veterinary Practitioners requesting Divisions to arrange demonstrations of *post-mortem* and laboratory technique. It was pointed out in the ensuing discussion that the meetings of this Division have frequently been in the form of demonstrations; the Secretary was asked to keep the request in mind when arranging future meetings. Major Wood suggested that more *post-mortem* specimens should be exhibited whenever possible.

An invitation was received from the Royal Sanitary Institute to appoint a delegate to the 1939 Congress. It was resolved that the Secretary should reply regretting that the Society would not be able to send a delegate to the Congress.

Mr. McLauchlan wrote suggesting that meetings might be held on Saturdays, but the members were agreed that it would be an inconvenient day for the majority.

"Some Aids to Diagnosis of Helminthic Disease

The President then asked Mr. E. L. TAYLOR to give his talk and demonstration on "Some Aids to Diagnosis of Helminthic Disease." This proved to be a most interesting, practical demonstration, presented in a really effective manner. In the discussion which followed, questions were asked and answered in an informal but direct way.

Mr. TAYLOR, who was welcomed by the President, said he very much appreciated the opportunity of saying something about parasitic worms. Veterinary helminthologists were rather scarce in this country at the present time and he did not think one heard as much of the researches into parasitic worms as one ought to do. He went on to say: "There are several diseases which are very important indeed, caused by parasitic worms—parasitic gastritis in sheep which, from an economic point of view, is the worst disease in sheep in the world; redworm disease in horses is probably the most costly disease of horses; husk is very important indeed, and there are several other important diseases, not forgetting, of course, liver fluke in sheep. Yet in the whole of this country there is only one senior post for a veterinary research worker on the diseases of animals caused by worms.

"There are very many species of parasitic worms in this country, about 50 to 80 different kinds for each domestic animal. Of that number, however, there are very few which are definitely associated with obvious disease, like those which have already been mentioned. Some helminthic diseases cause such obvious symptoms that common names have been given to them, 'liver rot,' 'husk,' and 'gapes' are three good examples, and it is to those diseases that I wish to confine our attention; the other large number of parasitic worms which are less definitely connected with disease must be left out of the discussion because of the shortage of time. The positive diagnosis of disease caused by parasitic worms, even of those several definite diseases, is by no means simple, one of the reasons being the very wide distribution of the parasites. What diagnosticians must learn is to distinguish between the determination of the mere presence of worms, and the diagnosis of disease.

"The parasitic worms which cause red-worm disease in horses or parasitic gastritis in sheep are present wherever horses or sheep are kept throughout the world, and on that account it is rather difficult to make a definite diagnosis

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through examining material merely for the presence of parasitic worms.

"The first requirement in making such an examination is to be able to recognise the eggs of the parasitic worms, and when brand new veterinary surgeons are turned out of college they are supposed to be able to do that. It is quite true, however, and no one would be likely to contradict the statement, that many practitioners are decidedly hazy about the characters of these eggs. The Advisory Committee of the N.V.M.A. on Parasitic Diseases therefore propose to publish a chart, with photographs of eggs of the common parasitic worms, and that ought to be of considerable help to the diagnostician. Unfortunately the collection of the eggs and the preparation of suitable photographs is rather a long business, preserved specimens being unsuitable for the purpose, and the charts may not be completed for some little time.

"The technique of the flotation and counting of eggs has improved during the last few years; to such an extent, in fact, that the very perfection of the technique has now brought a danger that is to be avoided. So many eggs are recovered from an ordinary flotation, and such a definite numerical result is obtained from an egg count that the diagnosis *appears* conclusive. Such is not the case, however; faecal examination is only to be regarded as an aid to diagnosis and cannot be relied upon in itself."

Demonstrating the method of flotation, Mr. Taylor said he thought it was Dr. Sheather's introduction of sugar as a suitable material for the flotation which popularised the method in this country. He then demonstrated the centrifugal flotation technique. Referring to the removal of the eggs from the surface of the liquid, however, he drew attention to the loss of eggs round the edge of the surface of liquid wherever a glass rod or small coverslip is used, and pointed out the advantages of dispensing with the centrifuge altogether and using a short tube with a slide resting on the top in such a way that it is in contact with the whole surface of the liquid. He said that after one-and-a-half or two hours the eggs come up to the surface, at the end of which time the slide is removed, the eggs being in the drop adhering to the under side.

To illustrate the dangers of the flotation technique in the diagnosis of helminthic disease, Mr. Taylor then went on to say something of the enormous rate of egg production of many parasitic worms which, for each female worm, could be numbered in thousands, tens of thousands and even hundreds of thousands a day. The misleading nature of the information derived from the casual use of this technique was very forcibly brought to his notice quite early when he began to take an interest in parasitic worms. He made an examination of the faeces of a dog and found an enormous number of eggs of *Toxascaris*; when he subsequently made a *post-mortem* examination, however, he found only one female worm to be present.

The second technique to which he wished to refer was concerned with the counting of the eggs in the faeces, and the estimation of the number of eggs per gramme of faeces. "This," said Mr. Taylor, "is a very simple procedure indeed, and of the many different methods that have been advocated the one most suitable for veterinary use is that frequently referred to as the Stoll technique. This can be carried out in about ten minutes' time. Three grammes of faeces are shaken in a bottle with 42 c.c. of water, a few glass beads being included to hasten the emulsification. The mixture is then screened, 0·15 c.c. pipetted on to a glass slide and all of the eggs counted in that amount. The resulting number, multiplied by 100, gives the number of eggs per gramme of the original faeces. The egg counting techniques and the estimation of worm infestation appears to be the last word in perfection. On being able to estimate the number of eggs per gramme so easily it would appear that research workers need only find out the number of eggs that represent one female worm and the number of males to each female, when they would be able to calculate exactly from the egg count, how many worms an animal contained. After some time, however, complications concerning egg counting technique that had not at first been suspected began to appear.

"The difficulty that strikes one as being most obvious is that the young worms do not lay eggs, and some worms take about three months to reach egg-laying age; there may, therefore, be quite a large number of worms present without showing themselves through a faecal examination. Another difficulty concerns the amount of water in faeces; there are six times as many eggs in dryish faeces as there are in diarrhoeic faeces. The nature of feeding of the animal is also very important. If an animal is starved or off its feed, then the egg count goes up enormously, but if an animal is changed from concentrated food to a lot of roughage then the egg count goes down. Less obvious and just as important is the strange operation of the immunity response of the host animal. Observations at Weybridge have shown that female worms in susceptible lambs lay 16 times as many eggs as female worms in resistant sheep. Another difficulty in the application of the egg counting technique concerns the different species of parasitic worms. There are about 20 or 30 species of strongyloid worm in the horse in this country. Some of them are very small and harmless, and some

are quite large and cause considerable injury to the walls of the large bowel. Some do more damage than others, and yet an ordinary straight egg count gives no idea of the numbers of the various species in the animal under examination. A count of 2,000 eggs per gramme in one animal may be compatible with a state of health, but only 500 eggs per gramme in another, if they represented the worst type of worms, might represent disease.

"It might be thought that these facts destroy all faith in the laboratory man's methods, but that is not the conclusion to which one should come. These examinations are very valuable as an aid to diagnosis; one must avoid the tendency to regard the results as the beginning and the end of the diagnostic procedure, but as an aid they are most valuable."

Dealing with the symptoms of parasitism Mr. Taylor said: "These alone are of little use to the diagnostician. It would not be so bad if even the indefinite symptoms which are known to be connected with worms could be relied on, but one cannot rely even upon these, because there are quite a number of diseases caused by worms in which those symptoms do not appear at all. Acute parasitic gastritis in sheep and lambs might come so suddenly that there is no time for any of those symptoms to develop. Acute husk, in calves and in adult animals, is another case in point; before there is any evidence in the development of the typical husky cough, or emaciation, the animals might develop pneumonia. In acute gapes in pheasants hundreds of young birds might be seen lying about dead without any gaping symptoms having appeared, and on making an examination the lungs might be found filled with the gapeworm larvae, which had been responsible for the fatal pneumonia.

"In arriving at a diagnosis of helminthiasis, knowledge of the life histories of the parasites is very useful, and of the history of the animals and their grazing environment. Although there is not sufficient time to go into the matter it might be stated that their aid to diagnosis is particularly helpful where lambs are folded on arable ground and over root crops. Other little points worth noting are, that a wasting disease in one isolated individual of a group of young animals would be unlikely to be due to parasitic worms; further help in diagnosis comes from a knowledge of age immunity. As animals grow older they develop a resistance to parasites, as a result of which older animals may often be seen grazing in perfect health in the same pastures where young animals are dying of helminthic disease.

"All these things ought to be read in conjunction with the data derived from the examination of the faeces. Evidence of both kinds is necessary. Of all the evidence, however, which aids in the diagnosis of these diseases there is nothing quite so good as a *post-mortem* examination. That is quite simple to carry out in the case of ascaris in dogs, or even red-worm disease in horses, or husk, or parasitic gastritis caused by the twisted wire-worm, because the worm is quite a respectable size. In other cases, the worms are so small that unless they are searched for in the proper way they are certain to be overlooked."

Mr. Taylor then described the method used in the examination of the fourth stomach and small intestine for these worms of a lamb, and concluded his address by demonstrating a number of useful hints in carrying out the laboratory part of diagnosis.

Discussion

Major Davenport said the subject had been very interesting to him because for two or three years he was engaged in counting worm eggs in faeces, and naturally drew certain conclusions. He was relieved to hear Mr. Taylor admit that he had had difficulty in correlating results under the microscope with the symptoms shown in a horse. The difficulty was to know whether what they found showed an excessive number of worms present or a natural number. A point which had always puzzled him was what justification there was in thinking that any given three grammes of faeces contained an identical number of eggs to any other three grammes taken from a horse at the same time. Was the distribution equal or quite casual? In his opinion it was casual. A short time ago he had an extremely interesting case of red-worm infection in a horse. He knew it was red-worm, but there were no eggs at all in the faeces, only larval forms. In very advanced cases of red-worm he thought they might not find worms or eggs, but only larval forms. In the case in question these larvae were detected by flooding a filtrate of the faeces over white blotting paper and examining in a good light.

Dr. Fraser thanked Mr. Taylor for his comprehensive survey of the subject and said they ought to be very grateful to him for explaining to them the developments which had taken place since they left college. He felt that very strongly because one of his clients had been asking for counts of faeces samples and having received a report of so many eggs per gramme had said, "Ah, yes! but what percentage of these are pathogenic?" While it was important for the veterinary surgeon to realise that worm infestation might be pathogenic or non-pathogenic, it was fortunate that not many clients were so up-to-the-minute in their information, especially as it was clear from Mr. Taylor's paper that this differentiation was a problem even in the laboratory and was quite beyond the scope of the general practitioner's work.

Mr. TAYLOR said they could not expect him to agree that there was no correlation between the egg count and the condition of the animal. He would agree with Major Davenport that possibly with Army horses and perhaps also with the very well-fed and managed thoroughbreds with which he had been dealing recently, they hardly ever came across a case of pathogenic infestation, in which case he would not expect to find correlation. But when they came to red-worm disease they got a very marked difference between the egg count when compared with a horse which was only very slightly infected. The eggs were very evenly distributed, and he felt perfectly certain that in the case of the strongylus worm of horses they were very evenly distributed in the faeces. One would expect there to be a real fluctuation from day to day, but he had been surprised at the evenness.

Mr. BECKETT expressed the thanks of all those present to Mr. Taylor for his talk and demonstration.

A fully attended meeting of the Council had preceded the general meeting, to which it made two recommendations, now formally proposed:—

(1) Proposed by Mr. J. F. D. TUTT, seconded by Mr. J. B. WHITE, and agreed unanimously: "That the resolution, relating to a lay Press article, agreed by the October meeting, be rescinded and deleted from the minutes."

(2) Proposed by Major WOOD, seconded by Major FACER, and agreed unanimously: "That decisions regarding future meetings and conduct of the Society be left to the Annual General Meeting in March."

Tea, very kindly provided by Major Facer and Mr. G. N. Gould, was then enjoyed by all, and sincere thanks, unanimously acclaimed, were expressed.

H. S. CALDWELL, *Hon. Secretary.*

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Veterinary Medical Association of Ireland*

MEETING IN DUBLIN

The November General Meeting of the Veterinary Medical Association of Ireland, was held at the Veterinary College of Ireland, Ballsbridge, Dublin, on Wednesday, November 30th, 1938, at 7.30 p.m.

The following members were present: Professors O'Dea (President), Nicholson, O'Connor and Browne, Miss Bisset, Messrs. Spears, F. O'Leary, Mullaney, Sleith, Timoney, P. J. Gaffney, P. F. Dolan, Donnelly, Cushnahan, E. V. Kelly, J. E. Kenny, J. P. Nowlan, J. J. Condon, M. J. MacClancy, L. F. Doyle, McGaughey, McGeady, Sheehy, J. D. O'Connor, G. Briggs, Harnett, Morris, P. J. Nolan, P. M. McManus, P. J. O'Donoghue, M. J. Byrne, P. A. Rogan, Senator Sean O'Donovan and J. M. Murphy (Hon. Secretary).

Apologies for non-attendance were received from: Messrs. J. D. Whitty, F. S. Ringwood, L. M. Magee, J. A. Flynn, R. R. Pierse, J. J. O'Brien, D. Reeves.

The minutes of the August General Meeting were read, confirmed and signed.

Report of Council.—The HON. SECRETARY read a report of the proceedings of the Council Meeting held on Friday, November 4th, 1938, the chief item of which was the discussion on the proposed extension of the Veterinary College.

He also reported that a joint deputation from the Veterinary Council and the Veterinary Medical Association of Ireland had been received by the Department of Agriculture on the matter. He himself was absent from this deputation through illness. Mr. P. F. DOLAN then kindly informed the members as to what took place at the interview.

Paper.—A paper entitled "The Regulation of the Female Sexual Cycle" was read by Professor J. A. NICHOLSON, M.A., PH.D., M.R.C.V.S., Veterinary College of Ireland.

This paper engaged the eager attention of all present.

The discussion was ably opened by Professor J. J. O'CONNOR, M.R.C.V.S., Principal of the College. Several members contributed to the discussion and Professor NICHOLSON, in reply, dealt with the criticisms.

[Professor Nicholson's paper and a report of the discussion and reply are reproduced at the commencement of this issue.—*Editor.*]

The HON. SECRETARY proposed a very hearty vote of thanks to Professor Nicholson for his excellent paper. This was seconded by Professor O'CONNOR and passed unanimously.

Vote of Condolence.—A vote of condolence with the family of the late Mr. Valentine Stack was passed in silence, all the members standing.

J. M. MURPHY, *Hon. Secretary.*

*Received for publication January 6th, 1939.

ARMY ESTABLISHMENT OF HORSES

In the recently published Army Estimates for 1939 (Stationery Office, 5s.) it is stated that further reductions in the establishment of horses bring the total down to 4,455 as compared with 5,205 last year and 28,742 in 1914.

Among the measures of reorganisation in the different arms of the service may be mentioned the mechanisation of all but two regiments of Cavalry of the Line at home and and of two of the four regiments in India.

IN PARLIAMENT

The Colonial Office and Veterinary Services

ADVISER IN ANIMAL HEALTH: MINISTER TO RECEIVE N.V.M.A. DEPUTATION

In the House of Commons on Wednesday, March 1st, Mr. MARKHAM asked the Secretary of State for the Colonies whether, in accordance with the recommendation of the Lovat Committee, an adviser in animal health will be appointed to the Colonial Office to assist colonial veterinary services?

Mr. M. MACDONALD: An adviser on animal health was appointed in 1930. On his death in 1932 it was decided in view of the financial position and of other considerations not to appoint a successor. Since then the matter has been reviewed from time to time and has recently engaged my personal attention. I recognise that in some ways there would be advantage in the revival of the post, but I am not satisfied that the circumstances are such as would justify me in making an appointment at the present moment.

I understand, however, that the National Veterinary Medical Association wish to send a deputation to discuss this question with me, and I shall be prepared to receive such a deputation at an early date.

. . . . . .

The following further questions and answers have been recorded in the House of Commons recently:—

POULTRY INDUSTRY

Mr. GALLACHER asked the Minister of Agriculture whether he has considered the communication from the Council of Scientific Poultry Breeders Association concerning the plight of the poultry-breeding industry in this country; and what steps are being taken to remedy the position in an industry so important in the matter of assuring food supplies?

Sir R. DORMAN-SMITH: Yes, Sir. The Government have already announced their intention to introduce this Session legislation for promoting the welfare of the poultry industry.

Mr. GALLACHER: In view of the very serious situation which confronts the small poultry-breeders in Scotland, will special consideration be given to their side of the industry?

Sir R. DORMAN-SMITH: The Bill will deal with the whole of the industry throughout the country.

Mr. T. WILLIAMS: Can the right hon. Gentleman say when the legislation will be introduced?

Sir R. DORMAN-SMITH: No, I am afraid that I cannot.

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RICHMOND PARK (HORSE RIDING)

Mr. R. MORGAN asked the First Commissioner of Works for what reason it is proposed under the new regulations for Richmond Park that henceforward the park authorities disclaim all liability for any accident which may be incurred by riders using that park; what are the liabilities at the present time of the park authorities with regard to such accidents caused by the dangerous nature of the ground, whether or not this is in no way due to negligence on the part staff?

Sir P. SASSOON: Those who ride in Richmond Park do so at their own risk. The proposed new regulations, to which my hon. Friend refers, do not seek to make any change in the legal position in this connection. Portions of this large area of natural open country become, at times, owing to weather conditions, unsuitable for riding, but this is in no way due to negligence on the part of the park staff.

Notes and News

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events

Mar. 11th.—Annual General Meeting of the North of England Division, N.V.M.A., at Newcastle-on-Tyne, 11 a.m.

Mar. 13th.—Meeting of the Editorial Committee, N.V.M.A., at 36, Gordon Square, W.C.1, 4 p.m.

Mar. 17th.—Meeting of the Welsh Branch, N.V.M.A., at Cardiff.

Mar. 17th.—Annual Dinner and Dance of the Yorkshire Division, N.V.M.A., at Leeds.

Mar. 17th.—Annual Dinner of the Royal Counties Division, N.V.M.A., at Oxford, 6.30 p.m. for 7 p.m.

Mar. 22nd.—Annual General Meeting of the Western Counties Division, N.V.M.A., at Exeter, 2 p.m.

Mar. 23rd.—Annual General Meeting of the South-Eastern Division, N.V.M.A., at Maidstone, 2.30 p.m.

Mar. 30th.—Annual Dinner and Dance of the Midland Counties Division, N.V.M.A., at Birmingham.

April 1st.—Annual Fees due to R.C.V.S.

April 3rd.—N.V.M.A. Committee Meetings at 36, Gordon Square, W.C.1.

April 4th.—N.V.M.A. Committee Meetings at 36, Gordon Square, and **Council** Meeting at the Connaught Rooms, Great Queen Street, Kingsway, W.C.

April 12th.—R.C.V.S. Committee Meetings.

April 13th.—R.C.V.S. Committee Meetings.

April 14th.—R.C.V.S. Committee and **Council** Meetings.

April 21st.—Meeting of the Sussex Division, N.V.M.A., at Brighton, 2.45 p.m.

May 4th.—R.C.V.S. Council Election. Last day for nominations.

May 8th.—Animal Management Examination begins.

May 15th.—Rome Congress on Comparative Pathology begins.

May 18th.—R.C.V.S. Council Election Voting Papers issued.
May 25th.—R.C.V.S. Council Election Voting Papers due.
June 1st.—**Annual General Meeting, R.C.V.S.**
June 8th.—D.V.S.M. Examination begins.
June 20th.—R.C.V.S. Committee Meetings.
June 21st.—R.C.V.S. Committee Meetings.
June 21st.—**R.C.V.S. Annual Dinner.**
June 22nd.—R.C.V.S. Committee Meetings.
June 23rd.—R.C.V.S. Committee and **Council** Meetings.
July 23rd—28th.—N.V.M.A. Congress at Great Yarmouth and Gorleston-on-Sea.

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R.C.V.S. Council Election

We are informed that the Voting Papers for Overseas Members in connection with the June, 1939, election of Members of Council, R.C.V.S., have now been despatched. Since our last intimation of additional nominations one further nomination has been received, namely, that of Dr. Tom Hare, whose proposers are Mr. P. J. Cautley and Mr. T. A. R. Chipperfield.

The complete list of candidates to date is as follows:—

Name	*Address*	*Proposers*
GLOVER, R. E.	Mill Hill	J. B. Buxton, T. Dalling.
HARE, TOM	St. Albans	P. J. Cautley, T. A. R. Chipperfield.
HOLROYD, J.	Blackburn	G. H. Locke, J. W. Brittlebank.
KIRK, W. H.	London	J. W. McIntosh. G. H. Wooldridge.
McINTOSH. J. W.	London	G. P. Male, G. H. Wooldridge.
MALE, G. P.	Reading	J. W. McIntosh. G. H. Wooldridge.
MILLER, W. C.	London	E. B. Reynolds, R. Simpson.
OLVER, A.	Edinburgh	J. M'Fadyean, G. H. Livesey.
SPICER, A.	Oxted	T. Dalling, G. H. Wooldridge.
STEELE-BODGER, H. W.	Tamworth	F. T. G. Hobday, H. W. Dawes.
WHITEHOUSE, A. W.	Glasgow	W. Robb, Helen J. Mitchell.
WOOLDRIDGE, W. R.	London	W. Nairn, T. Dalling.
WRIGHT, J. G.	London	J. M'Fadyean, H. W. Dawes.
YOUNG, T. D.	London	J. M'Fadyean, F. T. G. Hobday.

PERSONAL

Professor Share Jones Honoured

In recognition of conspicuous services to the University of Liverpool, the Council, on the recommendation of the Senate, has conferred the title of "Professor Emeritus" on Dr. J. Share Jones, formerly Professor of Veterinary Studies in the University. A biographical appreciation of Professor Share Jones appeared in these columns when he retired from his post at the University at the end of last year. It was in 1904 that Professor Share Jones went to Liverpool University to assist in the establishment of a new School of Veterinary Science, and from then until his retirement he was actively associated with its development.

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Appointment.—Mr. Edward O'Neill, M.R.C.V.S., who has been appointed Chief Veterinary Surgeon to the Great Western Railway, was the Company's veterinary surgeon at Birmingham. A native of Cork, Mr. O'Neill graduated at the Royal "Dick" Veterinary College in 1899. He practised as assistant to the late Mr. R. H. Cartwright and joined the service in 1901. Mr. O'Neill's area comprised the northern part of the system, including the very large depôt at Birmingham, and he also supervised the Bristol stud. He now takes over general veterinary supervision of all the Company's horses.

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Will.—Willett, Mr. Frederick William, of Staines, veterinary surgeon (net personalty £5,842), £23,609.

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R.C.V.S. OBITUARY

Purdy, Harold Kirkpatrick, M.C., Divisional Inspector, Ministry of Agriculture. Graduated Dublin, December 13th, 1924. Died February 27th; aged 47 years.

Major H. K. Purdy, M.C., M.R.C.V.S.

Major Harold Kirkpatrick Purdy, chief veterinary inspector for the Port of Birkenhead, passed away in a Liverpool hospital.

A native of Dublin, before the War he was a noted horseman. He served throughout the War in the Royal Field Artillery and was awarded the M.C.

Major Purdy, who went to Birkenhead from Holyhead three years ago, leaves a widow and one daughter.

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The Late Mr. David Drummond, M.R.C.V.S.

In reference to the death of Mr. David Drummond, of Newton Abbot, which we recorded with regret in our issue of February 25th, the *Mid-Devon Times* says that Mr. Drummond went to Newton Abbot from Scotland about eight years ago, and he was widely known and much esteemed throughout the district. He was honorary veterinary surgeon to the Newton Abbot Fat Stock Association, and was also keenly interested in the local Clinic for Sick Animals. His death followed a short illness, and much sympathy has been expressed with the widow in her bereavement.

Following a service at the house (7, Powderham Road), the funeral took place at Newton

Abbot Cemetery on February 22nd, when among those present were the following members of the Royal College of Veterinary Surgeons: Mr. D. S. Barbour, Captain Hearn, Captain Kauntze, Messrs. Mason, Fisher and Wyper.

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GENERAL OBITUARY

DRENNAN.—At 56, Polmuir Road, Aberdeen, on February 24th, 1939, Alice Isobel Findlay, widow of Robert Edward Drennan, M.R.C.V.S.

The death of Mrs. Alice Drennan, widow of Mr. Robert Drennan, who, as we recorded with much regret in December, passed away as recently as November 30th, 1938, will be a matter of deeply sympathetic interest to members of the profession.

The late Mr. and Mrs. Drennan are survived by two sons, aged 15 and 17 years respectively.

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LEGAL NOTES

Dog Breeder's Claim Fails.—In the High Court on March 3rd, Mr. Justice Branson gave judgment for the defendants after a two days' hearing of an action in which Mrs. Jeanne Marie Elizabeth Nicholas Josephine Harper, a dog breeder carrying on business at Moor Park, Northwood, Middlesex, claimed damages for alleged breach of contract from the Hon. Rozsika Rothschild and the Public Trustee, as executors of the late Lord Rothschild, who died on August 27th, 1937.

The plaintiff's case was that she imported and bred a breed of dog known as the Pyrenean Mountain sheep dog. She said that by an agreement made with Lord Rothschild in August or September, 1936, she agreed to sell him for £131 5s. a bitch of that breed called Monne on the terms that she was to allowed to breed from her and retain as her (the plaintiff's) property any puppies which might be born to Monne.

Mrs. Harper complained that after Lord Rothschild's death the defendants, as executors, parted with possession of the bitch to Lady Sybil Grant, who claimed not to be bound by the terms of the agreement and refused to perform it.

The plaintiff alleged that a litter of puppies from Monne would be worth from £700 to £800, and that eight litters was a reasonable estimate of the number of litters likely to be produced.

The defendants, by their defence, denied the alleged agreement. They pleaded that if any arrangement between Mrs. Harper and Lord Rothschild was a binding agreement it was an express or implied term of that agreement that Monne should not be mated unless and until in a perfect state for bearing puppies, and that that condition had never been fulfilled.

The defendants further pleaded that, if there was a binding agreement as alleged, Lady Sybil Grant took possession of Monne with notice of the agrement so as to be bound by it, and they claimed that they were entitled to enforce against her any rights which the plaintiff acquired under the alleged agreement. Finally, they pleaded that Mrs. Harper was on September 12th, 1937, informed by letter that Monne was to be given to Lady Sybil Grant and that, as she made no protest against the proposed gift at the time, she was now estopped from saying that it constituted a breach of the agreement.

Mr. D. N. Pritt, K.C., and Mr. P. B. Morle appeared for the plaintiff; Mr. N. J. Laski, K.C., Mr. Roger Bacon, and Mr. John Foster for the defendants.

Mr. Pritt, opening the case, said that Mrs. Harper, as a hobby, carried on the breeding and introduction into England of the Pyrenean Mountain Dog. There was a Pyrenean Mountain Dogs Club, of which the late Lord Rothschild was a vice-president. The agreement was partly oral and partly contained in subsequent letters. While Lord Rothschild was alive it went quite well. He died in August, 1937, and, after his death, his executors, without making any plans to secure Mrs. Harper's contractual rights, gave Monne, which had not had any puppies, to Lady Sybil Grant, daughter of the late Lord Rosebery. Lady Sybil still had the bitch and would not allow her to breed. Counsel submitted that there had been repudiation of the contract whereby Mrs. Harper had lost considerably, as a litter of puppies would be worth from £700 to £800.

Mrs. Harper, in giving evidence, said that she first found this breed of dog when she visited the Pyrenees in 1926. The average litter from the breed was seven.

Professor J. G. Wright, F.R.C.V.S., giving evidence for the defence, said that when he examined Monne in November, 1938, he found weakness in her hind legs which he ascribed to lack of nervous control. In his opinion she was not then and was never likely to be a suitable animal for breeding.

Mr. Guy Sutton, F.R.C.V.S., said that in his opinion Monne was not fit for breeding purposes. She had enough difficulty with her own weight, and it would not be right to subject her to the extra weight involved by pregnancy. He imagined that the market for that breed of dog was very small. He had never been asked to examine one for sale.

Further evidence having been called for the defendants with regard to Monne's health, Mr. Laski, addressing his Lordship on behalf of the defendants, submitted that the fair reading of the contract, contained in letters passing between Lord Rothschild and Mrs. Harper in September, 1936, was that the only right which it gave to Mrs. Harper was a right to have Monne's first litter if she should in fact be mated, with a provision for amendment of the contract in the event of subsequent litters. Mrs. Harper was only entitled to a litter if there should be one. Further, the contract was void for uncertainty because all the terms were lacking which were necessary to give it business validity. In conclusion, Mr. Laski submitted that in any event Mrs. Harper could only be entitled to technical damages because of the many possibilities, such as defective or stillborn puppies.

Mr. Pritt submitted that the plain effect of the contract was that Monne would in the normal course bear litters, and that those litters should belong to Mrs. Harper. There was, of course, a very strongly implied term that Monne must at any relevant time be fit to bear a litter. He (counsel) accepted that Monne was now not fit to breed, but the main point of the case was whether she had ever been so, and he submitted that on all the evidence it was plain that she could have borne a litter at the suitable time which occurred in about October, 1937. The veterinary surgeons' evidence seemed consistent with the view that Monne's nervous complaint was due to something which had happened after that date.

Mr. Justice Branson, giving judgment, said that, in his opinion, the true meaning of the contract was that if and when Monne should have puppies they would be handed over to Mrs. Harper. But there was no obligation to mate the animal at any given suitable time which

should occur. To give the contract any other meaning would be to imply into it a series of terms when the language in the contract itself was susceptible of a simple and reasonable meaning. Therefore, as Monne had had no litter, the only possible breach which could have taken place must have been an anticipatory breach by repudiation.

His Lordship referred to a letter which was relied on by the plaintiff as constituting a repudiation, and said that that letter did no more than reaffirm the terms of the original contract. There having been no breach and no repudiation, it followed that the action must fail. But it would be wrong to leave the matter there, since a great deal of evidence had been called on the question whether Monne was ever in a fit condition to mate.

Reviewing the evidence on that point, his Lordship said that passages had been read to him from a book on the Pyrenean Mountain dog showing that a normal dog of that kind was able to stand any amount of exposure or hard usage, run with a horse, and generally to behave as might be expected of a great big powerful dog. It was clear that from as early as February, 1937, Monne was not of that type. He was satisfied on the evidence that Monne was not fit to mate in October, 1937, and it was plain enough on the evidence of the veterinary experts that the chances of her ever being fit to have a litter were negligible.

There must, therefore, be judgment for the defendants, with costs.

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Tuberculous Cows at Market.—At the Wigan Borough Police Court on February 23rd, Frank Kirby, of Carr House Farm, Bretherton, and Henry Blakemore, of Langley Hall Farm, Atherton, were each fined 10s. when summoned for each being in possession of a cow showing definite clinical signs of tuberculosis, and failing to give notice of the fact to a member of the police force or a veterinary inspector.

Superintendent Rigby said the two cows were exposed for sale at the Wigan Cattle Market, and when they were examined by Major Walker, veterinary inspector for the Ministry of Agriculture, they showed symptoms of tuberculosis. He informed the auctioneer and the cows were subsequently slaughtered. Both were tuberculous and the carcases were condemned by the meat inspector. Supterintendent Rigby held that the symptoms should have been noticed by the owners of the cows.

Evidence was given in support of this statement.

Both defendants pleaded not guilty and held that the symptoms were not apparent. Blakemore called evidence to the effect that his cow was apparently sound.

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Motorists who go into agricultural districts must put up with the dangers from animals, said Judge Frank Davies at Carmarthen County Court. He was giving judgment for defendant in a case in which a motorist sued a St. Clear's farmer for damages to his car alleged to have been caused by defendant's horse.

INSPECTION OF AN ANIMAL AT MARKET

Complaint concerning the inspection of an animal at Exeter Cattle Market was made at a recent meeting of Devon Diseases of Animals Sub-Committee.

Mr. W. Baker stated that a veterinary inspector of the Ministry of Agriculture said he had reason to believe that a heifer which had been placed in the ordinary grade was tuberculous. The official did not touch the animal nor hear it cough. The owner was found and was very much surprised. He said it was a fat heifer and there was nothing wrong with it. Asked for his authority, the Inspector said he was a veterinary inspector of the Livestock Commission. The owner took the animal out of the market and had it examined by an Exeter veterinary surgeon who said he found nothing wrong with it. The order was withdrawn.

Mr. D. S. Barbour, Divisional Inspector of the Ministry, said he had received a report on the case, which did not tally with the description given by Mr. Baker. A Ministry Inspector had the right to inspect any animal in the market if he had grounds for suspecting that it might come within the Tuberculosis Order, and was entitled to turn it out of the market till he had made a proper examination. All the inspector wanted to do was to take the animal to some quiet place where he could examine it.

Correspondence

Letters to the Editor should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue.

All correspondence must bear the name and address of the contributor for publication.

The views expressed in letters addressed to the Editor represent the personal view of the writer only and must not be taken as expressing the opinion or having received the approval of the N.V.M.A.

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POTENCY OF SYNTHETIC MEDIUM TUBERCULIN

To the Editor of the Veterinary Record

Sir,—I have read with great interest the two articles published by Montgomerie and Thomson in recent issues of your journal* on the suitability of certain synthetic medium tuberculins for the testing of cattle. As I have been particularly concerned with many aspects of this problem perhaps I may be permitted to make a few comments on their observations.

One of the most difficult factors in tuberculin testing of cattle is the narrow margin which separates the negative reaction from misleading pseudo-positive responses in non-tuberculous animals. During the period when synthetic medium tuberculin was being produced at Cambridge, certain instances of the dangers which may arise when unsuitable strains are used for tuberculin production, were encountered. It is important to note that suspicion that these tuberculins were not entirely satisfactory was obtained only *after extensive tests in the field*, and were not detected by the restricted tests on negative animals which are commonly available in laboratories. The preliminary investigation of Montgomerie and Thomson showed that certain synthetic medium tuberculins prepared at

**Vet. Rec.* 1938. 50. 1759: *ibid.* 51. 239.

Langley Court were unsuitable for use in cattle in an undiluted form since they produced a "spongy bean-like swelling" in two out of eight beasts (page 1760). I feel that one of the most disturbing features of this work is the capacity of these tuberculins, in a strength equivalent to or twice the potency of International Standard, to evoke reactions of this description. It is true that it is claimed by the writers that when diluted 1 in 2½ or 1 in 5, according to their initial strength, these tuberculins were quite satisfactory from this point of view, and a study of their protocols would suggest that no evidence of aberrant reactions in clean herds was encountered. Nevertheless, they put forward the suggestion that "the better positive reactions to L.C. were, at least in part, due to its greater tendency to diffuse from the point of injection" (page 1769). The implication is that the unwanted reactions produced in negative cattle with their strong tuberculins were due to this same attribute. This is a plausible explanation of their results: it is equally likely that these strains may produce a "diffusing factor" which may have been responsible for these reactions. One is tempted to enquire as to whether the factor of safety worked out by the writers will hold for every batch of tuberculin. Presumably the stocks which were used in their investigation will eventually disappear and fresh batches will be required. Just as the amount of the specific principle is liable to fluctuate as between different brews of tuberculins, so are variations in the degree of diffusion and the capacity to produce pseudo-positive swellings likely to arise. It is not unreasonable to suggest that every future batch will have to be tested very carefully, and one would submit, from a not inconsiderable experience, that such tests would be required to be applied to a fairly large number of animals since the question of the capacity of a given tuberculin to produce misleading reactions often arises in only a very small proportion of animals which are tested.

The absence of *post-mortem* evidence in the investigations of these authors, and indeed in many enquiries into the relative value of different tuberculins, is a drawback which is freely admitted on all sides. I am in entire agreement with their statement that ". . . it was realised that the suggestion that the more potent tuberculin had given the more correct result where there was disagreement could only be determined by the *post-mortem* examination of a considerable number of suitable animals. An attempt to arrange this . . . broke down for reasons beyond the control of the writers." I myself have used the method of comparison of two tuberculins in tuberculous and non-tuberculous herds in which the results have not been confirmed by *post-mortem* examination, and am aware of the dangers associated with conclusions drawn from incomplete data of this nature, especially when they are related to anomalous or unexpected reactions.

It is, of course, accepted that the writers of these articles have had considerable experience of the interpretation of the double intradermal test: nevertheless, one notes with surprise that constant reference is made to the production of a "large bean" by C.T. tuberculin in negative animals. The feature of the batches of synthetic medium tuberculins produced at Cambridge was the small response induced in the skin of negative animals. It was more restricted than that produced by a synthetic medium tuberculin supplied by the Bureau of Animal Industry, U.S.A., and was in striking contrast to the "bean-like" swellings which can be legitimately used to describe "O.T." reactions. I have had occasion to test recent batches of C.T. tuberculin and have found that the response in negative animals has always been of the nature of a small pea (average increase in measurement of 1·5 to 2 mm.)

The results obtained in the second paper also call for some comment. In the first place it must be remembered that P.P.D. was produced entirely for human use. Tuberculosis in both man and the guinea-pig usually induces an extremely high state of sensitivity to tuberculin protein and relatively high dilutions are invariably employed, particularly in man. In consequence, the danger of misinterpretation in negative subjects scarcely arises. The position in cattle, however, is entirely different, and it does not follow that because P.P.D. has proved useful in the human field it will be equally suitable for the infected bovine subject which is so much less sensitive. Montgomerie and Thomson very properly draw attention to the dangers which may arise when P.P.D. is used in a strength equivalent to or half International Standard and note that in this concentration it *may* induce reactions difficult to interpret in negative cattle. It is particularly significant that on page 234 they say "the typical negative to P.P.D. differs somewhat from that to C.T. In its tendency to produce a *soft** swelling P.P.D. resembles the L.C. and U.S.A. tuberculins. This may be regarded as a disadvantage since some may fear that the abnormally large negative (say 3 mm. increase in skin thickness), *being circumscribed yet soft** might be confused with a positive swelling showing just a little oedema. . . . On the evidence available it need not be anticipated that they will be particularly troublesome when P.P.D. of suitable potency is used." Montgomerie and Thomson infer that P.P.D. diluted three times is a suitable strength for cattle use, but again one may venture to suggest that the margin of safety is extremely small. Taking into account the variations in individual or herd responses, of which I have had considerable experience, one feels that P.P.D./3 might on occasion give rise to most disturbing reactions in tubercle-free animals.

The results of the herd tests with various dilutions of P.P.D. are distinctly interesting. They show that in cattle presumed to be affected, all dilutions of P.P.D. down to P.P.D./6 and L.C. tuberculin, were in *every case* superior to C.T. When it is realised that the guinea-pig tests at Langley Court appear to show that C.T. is usually about one-quarter the strength of International Standard and therefore half as strong again as P.P.D./6, this result is certainly remarkable. Bearing in mind the lack of correlation between guinea-pig and cattle tests to which Montgomerie and Thomson have referred (page 1760), and with which I am in entire agreement, these findings might be regarded as disturbing and indicative of an extremely low potency on the part of C.T.

It must be remembered, however, that all synthetic medium tuberculins produced at Cambridge were tested for potency in *cattle* against a standard tuberculin and none was issued unless it was at least equal in value to the standard. (In order to ensure that there is no misapprehension on this point the statement on page 1759 requires amplification, *viz.*: "Buxton and

*Italics are mine.

Glover (1933) were content with a potency about equivalent to the standard adopted by the Institute of Animal Pathology, Cambridge, for 'old tuberculin' for use in this test on the basis of numerous experiments and a wide field experience." It is necessary to point out that the "standard" tuberculin used for the determination of potency of both old tuberculin and synthetic medium tuberculin was of equal strength to the old Frankfurt standard and therefore equivalent to the present International Standard (guinea-pig test). When tested in cattle, it showed a potency of about one-and-a-half times the standard.)

As I have no reason to believe that any material alteration in the method of production and determination of potency have been introduced for the synthetic medium tuberculins as prepared at the Royal Veterinary College, these results are beyond my comprehension. We arrive at the extraordinary position that C.T. tuberculins, having a potency according to the cattle test about equal to International Standard, are found by the Langley Court workers to be much less potent than L.C. tuberculins diluted about two-and-a-half times in respect of the same standard. It is even more remarkable that a much less potent preparation, *viz.*, P.P.D./6, which is about one-sixth the strength of the same standard, is capable of inducing greater reactions in tuberculous bovine animals than C.T. If the C.T. tuberculins are adequately tested in cattle, still more confusion is introduced by the statement in the addendum (page 236) that two recent batches of C.T. were much more potent both for guinea-pigs and for *cattle*. The inference here is that there are wide variations in the potency of synthetic medium tuberculins as produced at the Royal Veterinary College.

Undoubtedly these articles have had a disturbing effect on the mind of the practitioner who naturally demands an assurance that the tuberculins which he is accustomed to use are of adequate potency. I would suggest that the evidence advanced by Montgomerie and Thomson, while it is of considerable interest, is at present insufficient to justify any serious qualms in regard to the suitability of the tuberculins which are in current use. At the same time I agree that an impartial enquiry should be initiated and warmly support their plea that a thorough investigation should be undertaken by an independent body. I would urge, in the first place, that this enquiry should be restricted to: (1) a consideration of the preparation of a suitable standard bovine tuberculin, and (2) a comparison of the methods of preparation of synthetic medium tuberculins, *e.g.*, suitability of different strains, methods of separating the active principle, etc. It should be conducted on broad lines and not restricted to the particular tuberculins mentioned in these articles.

Yours faithfully,

R. E. Glover.

National Institute for Medical Research,
Farm Laboratories,
Mill Hill, N.W.7.

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THE INTRADERMAL TUBERCULIN TEST

To the Editor of the Veterinary Record

Sir,—Regarding the article by Dr. Montgomerie and Mr. Thomson in the current issue of the *Record*, I have been privileged to see some of the work on which it was based. I was particularly interested to notice the similarity between the negative swellings to L.C., to P.P.D. and to U.S.A. tuberculins. The soft pea which they produced in clean cattle contrasted with the firm one of the typical negative to Camden Town tuberculin. One would almost conclude that the soft type was normal for synthetic medium tuberculin and wonder why C.T. stands alone in the production of a hard pea which is more characteristic of old tuberculin. Has it something to do with the glycerine content or some factor which hinders diffusion?

Abnormally large firm swellings to C.T. complicate the interpretation of the test and their incidence varies from herd to herd. I have kept a number of cases under observation and repeated the test at intervals of one to two months; some continued to give large readings, others reverted to the normal negative, while an occasional animal gave a positive reaction on retest. Retested at intervals of a few days, at sites well removed from the previous one, there often has been a tendency for a progressive reduction in the size of the swelling; such as to suggest that some general desensitisation was taking place. These large hard swellings certainly complicate the readings in some herds, for it is difficult to say whether there is any true diffusion in these circumstances.

There is room for much further work on the sensitisation of animals to tuberculin by organisms other than the bovine tubercle bacillus (and perhaps other proteins). The authors of the recent article instanced two animals, page 231, which were probably affected with avian tuberculosis and yet were sensitive to some extent to mammalian tuberculin. Some of my personal observations have suggested that avian infection is more widespread in dairy cattle than has been generally supposed and it would seem that avian infection may cause reaction to ordinary tuberculin over quite a long period. I would suggest that the profession seek authoritative opinion, backed by actual experience, on the significance of avian infection as a complication in tuberculin testing. A good annotation in the *Record* would serve the purpose. I am inclined to the opinion that quite a proportion of reactors turned out of "clean" herds may be avian cases and feel that it would be advisable to retest such animals with both avian and bovine tuberculins as a routine measure. If the animal then reacted more markedly to avian tuberculin, or to it only, what should be its fate? Is it possible that some of the above-mentioned large firm swellings may be the result of avian infection?

I do agree that the advantages of a single intradermal test are such that considerable effort should be directed towards the finding of "a sufficiently potent suitable tuberculin" for use in a single intradermal test. There has been general comment on our adhering to a double intradermal test, while on the American continent, admitting its advantages, such striking progress continues to follow the use of a single injection test.

The addendum to the recent article may have come as a shock to some members of the profession; to others it may have confirmed an existing fear. I am among those who, in the past, have suspected that the potency of the tuberculin I was using varied somewhat. A simultaneous test with four current batches carried out on some of my cattle gave convincing proof that the more recent batches were of much increased potency. I had become convinced of the need for a more potent tuberculin and I hope we may take the recent change as evidence of

similar conviction in higher quarters. It is disheartening to feel that much of the effort expended in cleaning up one's herds has been nullified by the use of tuberculin of low potency.

It would appear, from recent articles and correspondence, that considerable importance is still placed on accurate measurements. It is my opinion that except as useful adjuncts for record purposes, measurements are valueless and sole reliance must be placed on the character of the swelling; super accurate measurements are, therefore, unnecessary.

Finally, with regard to Mr. Edwards' letter in your issue of February 18th, the purport and purpose of his final photograph is difficult to comprehend. I cannot see that his most interesting piece of work gives any indication as to the specificity of the tuberculin used. Nor could I consider a very specific tuberculin of any value to the profession unless it be used at a potency sufficient to give it "the ability to produce skin reactions" in infected cattle.

Yours faithfully,

R. C. U. Fisher.

London.

March 2nd, 1939.

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To the Editor of the Veterinary Record

Sir,—The article by Mr. W. D. Blanchard, M.R.C.V.S., in the *Record* for February 25th is very interesting, especially from the point of view of husbandry conditions, which cannot be said to be universally known by those engaged in the eradication of tuberculosis. One wonders, however, what the County Council of Herefordshire is doing when work has to be carried out in a semi-dark cowhouse squeezed up between two objecting cows. Surely at this time of day such a cowhouse should have been remodelled.

The human health drive places primary importance on the abolition of slums and in my opinion the abolition of cowhouse slums is equally important for the health of cows even if they only come in to them in winter time after residence in the fresh air and sunshine—and what a wonderful and convenient time exists in Herefordshire to carry out this work.

The syringe illustrated by Mr. Blanchard seems to me to be rather a poor model. For years I have been using one, made by the Dental Manufacturing Company, which has given satisfaction and not leaked. I append an illustration of it: as an up-to-date dental syringe it "fills the bill."

Yours faithfully,

G. Mayall.

Bolton.

PROFESSIONAL A.R.P. SERVICES

To the Editor of the Veterinary Record

Sir,—The Home Office suggested that Local Authorities pay those who lecture to air-raid wardens, etc., 12s. 6d. an hour, while practical instructors receive 7s. 6d. an hour.

The B.M.A. announces its policy as follows: "For first-aid lectures in connection with A.R.P. schemes a fee of not less than £1 1s. should be payable for each lecture of one hour's duration, with suitable provision for mileage."

So the Department has intimated that it is desired that "the valuable services of the medical profession should be utilised to the full instead of being devoted to the duties which laymen can perform adequately" and that the lecturer be paid £1 1s. or more according to the size of the class.

In connection with *voluntary service with pay* the B.M.A. has advised its members "to refer to this statement should they be approached . . . where the fees offered are lower than those approved by the Association."

Yours faithfully,

W. Philipson Moss.

Sycamore House,
Chobham Road,
Woking.

March 4th, 1939.

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"RABIES NOT ABSENT IN VENEZUELA"

To the Editor of the Veterinary Record

Sir,—I have just received your issue of February 4th containing Mr. Morgan's letter of January 3rd, published under the above heading. Of course, canine rabies is not absent from Venezuela, and I cannot understand how "the Spanish Main" insinuated itself into that particular paragraph of my talk (on page 1366, not 1336 as your printer has put it in Mr. Morgan's letter). It was quite obviously my mistake as I had no intention of even commenting on dog rabies on the mainland of South America. It was not altogether an unfortunate mistake, however, as without it, we should not have had Mr. Morgan's most interesting account of the situation in Venezuela, and his tribute, to which I subscribe, to Captain Metivier's successful efforts in preventing canine rabies from entering Trinidad.

Yours faithfully,

Thomas W. M. Cameron.

Canada.

February 21st, 1939.

Advertiser's Announcement

"WELLCOME" BRAND OVITOXICUS ANTI-SERUM.

Recent investigations have shown that the disease known as "pulpy kidney" in lambs appears to be due to infection with *Clostridium ovitoxicus* (*B. welchii*, Type D). As a result of research work carried out at The Wellcome Physiological Research Laboratories, "Wellcome" Brand Ovitoxicus Anti-Serum (*B. welchii*, Type D, Anti-Serum), designed for prevention of pulpy kidney in lambs, has been introduced and is now available to the veterinary profession.

It is suggested that, on farms where pulpy kidney is troublesome, 2 c.c. of the serum should be injected into all lambs when about two weeks old. As experience accumulates, it may be found that on badly-infected farms it is advisable to repeat this dose when the lamb is six to eight weeks old. It should be noted that the serum is *not* designed for use in lamb dysentery.

"Wellcome" Brand Ovitoxicus Anti-Serum is issued by Burroughs Wellcome & Co. in containers of 100 c.c. (50 doses).